ELNA

Electronic Components

High Quality

CAPACITORS

ALUMINUM ELECTROLYTIC CAPACITORS WITH CONDUCTIVE POLYMER SOLID ELECTROLYTE
ALUMINUM ELECTROLYTIC CAPACITORS
ELECTRIC DOUBLE LAYER CAPACITORS "DYNACAP®"
PLASTIC FILM CAPACITORS

ELNA CO., LTD.
CAT.No.2015/2016E

ELNA®

Electric Double Layer Capacitors

“DYNACAP”, “POWERCAP”

List of Contents

2

★ : New series
☆ : Upgrade

■ Type List for DYNACAP

Category		Series	Category temp. range ℃ Max.	Category temp. range ℃ Min.	Max.operating voltage V.DC	Capacitance range F	Color of sleeve	Page	Applications	Remarks
For memory backup	Reflow soldering type	DVN	+70	−25	5.5	0.047 to 0.33	Brown	196	Ideal for backing up of RTC's, momentary backup of a battery etc.	☆
	Reflow soldering type	DVL	+85	−40	5.5	0.047 to 0.22	Brown	197		
	Standard type	DB	+70	−25	5.5	0.047 to 1.5	Indigo	198	Ideal for backing up of CMOS IC's, microcomputers, RAM's, RTC's and the like used in VIDEO's, tuners, TV sets, telephone sets, DVD and others.	
	Low profile Low ESR type	DBN	+70	−25	5.5	0.047 to 1.5	Indigo	198		
	Low profile High temperature type	DBJ	+85	−10	5.5	0.047 to 1	Black	199		
	Low profile Low ESR High temperature	DBS	+85	−25	3.6	0.047 to 1	Black	200		
	Miniaturized Standard type	DX	+70	−25	5.5	0.047 to 1.5	Indigo	201		
	Miniaturized Low ESR type	DXN	+70	−25	5.5	0.047 to 1.5	Indigo	202	Ideal for backing up of CMOS IC's, microcom-puters, RAM's, RTC's and the like used in VIDEO's, tuners, TV sets, telephone sets, DVD,pager units, cameras, personal wireless items and others.	
	Miniaturized High temperature type	DXJ	+85	−10	5.5	0.047 to 1	Black	203		
	Miniaturized Low ESR High temperature type	DXS	+85	−25	3.6	0.047 to 1	Black	204		
	High voltage tolerance type	DK	+70	−25	6.3	0.047 to 1	Indigo	205	Ideal for backing up of Li-battery backed equipment such as cameras, VIDEO's and telephone.	
	High temperature type	DH	+85	−25	5.5	0.047 to 1	Indigo	206	Ideal for backing up of controls, electronic rice cooking jars, home bakeries and others.	
	Wide temperature range type	DHL	+85	−40	5.5	0.047 to 1	Indigo	207	Ideal for backing up of CMOS IC's, microcomputers, RAM's, RTC's for smart meter. outdoor equipment, auto motive and industrial.	
	High temperature long life type	DHC	+85	−25	5.5	0.047 to 1	Black	208		
	Coin type	DC (614)	+70	−25	2.5	0.2	Silver	209	Ideal for backing up of pager, solar watches, solar calculators, solar remote control units, camaras and the like.	
		DCK (614)	+60	−10	3.3	0.2				
		DC (621)	+70	−25	2.5	0.4				
		DCK (621)	+60	−10	3.3	0.4				
	Reflow soldering Coin type	DSK (414)	+70	−10	3.3	0.07	Silver	210	Mountable on board with best suited for mainly memory and time functions as well as memory backup for PDA and DSC.	
		DS (614)	+70	−25	2.5	0.2		211		
		DSK (614)	+60	−10	3.3	0.2				
		DS (621)	+70	−25	2.5	0.33				
		DSK (621)	+60	−10	3.3	0.33				
For power	Standard type	DZ	+70	−25	2.5 / 2.7	1 to 200	Black	212	Ideal for power supplies of LED displays, personal wireless items, backup for power supplies, and the storage battery of solar battery.	☆
	Large capacitance type	DZH	+60	−25	2.5	22 to 300	Black			☆
	High power type	DZN	+70	−25	2.5 / 2.7	1 to 200	Blue	214	Ideal for actuator of moters and electromagnetic coil drives.	☆
	High power Low temperature type	DU	+65	−40	2.7	1 to 33	Brown	216	Ideal for actuator of moters and electromagnetic coil drives.	★
	Low temperature type	DY	+70	−40	2.5	1 to 40	Brown	217	Ideal for power supplies of LED displays, personal wireless items, backup for power supplies, and the storage battery of solar battery.	☆
	Packed type	DZP	+70	−25	5.0	0.47 to 4.7	Blue	218		☆

■ Type List for POWERCAP

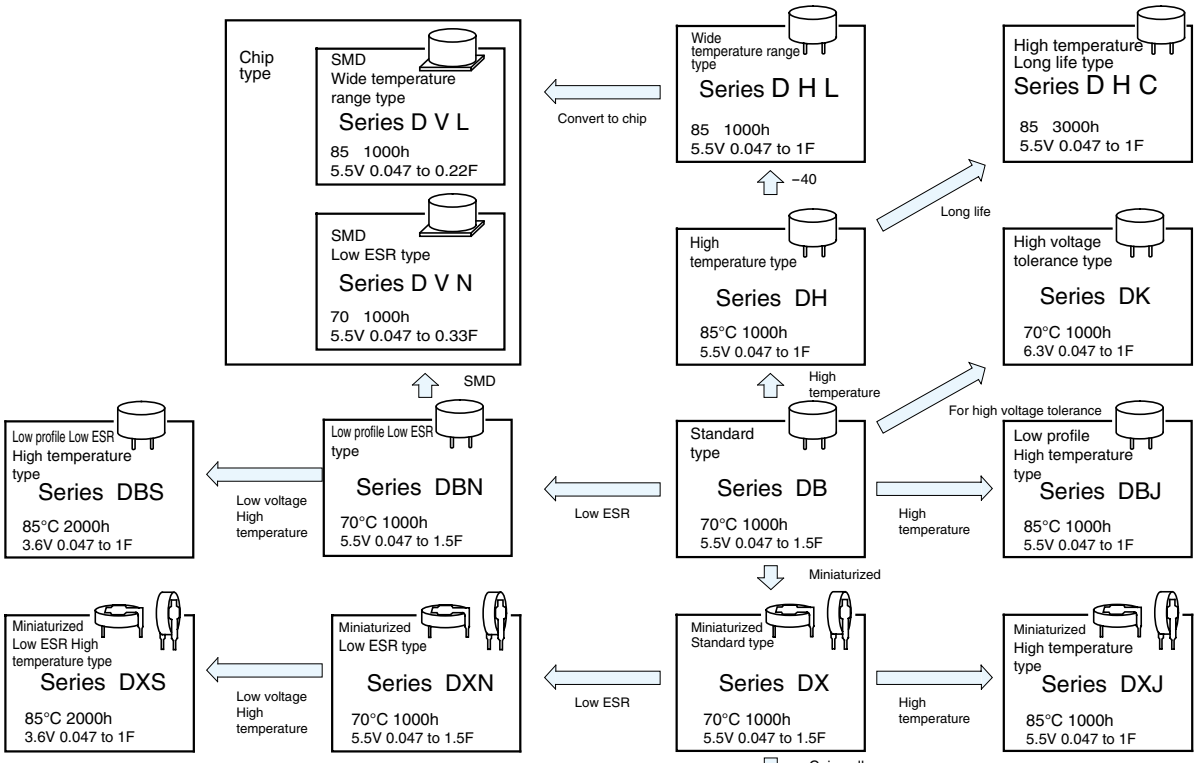
Category		Series	Category temp. range ℃ Max.	Category temp. range ℃ Min.	Max.operating voltage V.DC	Capacitance range F	Color of sleeve	Page	Applications	Remarks
For energy	Large capacitance High power type	DW	+65	−40	2.7	3000	Black	219	Ideal for boost charge, such as energy regeneration, and a large current discharge use.	★
	Large capacitance type	DP	+60	−25	2.5	500 to 1500	Black	220	Ideal for power supplies of LED displays, backup for power supplies, the storage battery of solar battery, and actuator of moters and electomagnetic coil drives.	

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

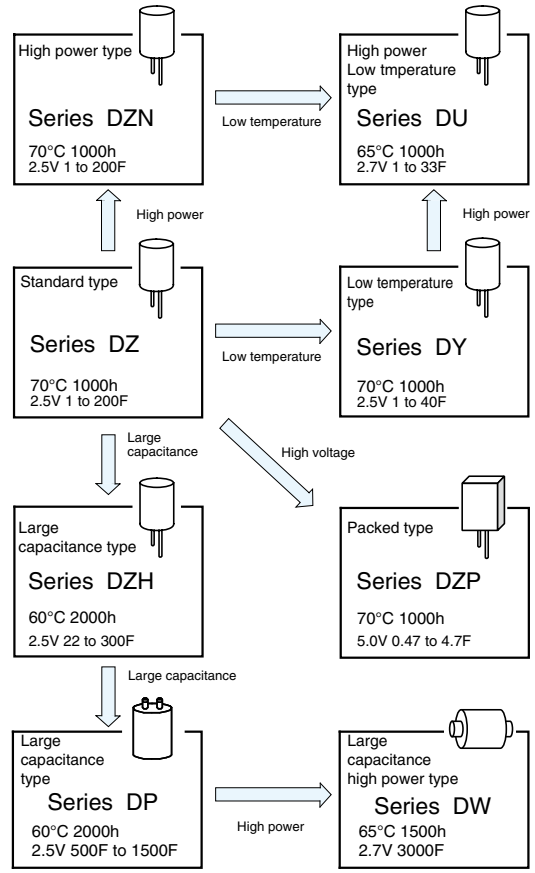
■ Systematized Classification of Electric Double Layer Capacitors

DYNACAP & POWERCAP

For memory backup



For power & energy



NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

■ Product Symbol System for Electric Double Layer Capacitors

□□□ – □□□ □ □□□ (□□) □ (□□□) □□□ – (□□) □□□

① Series code
② Max operating Voltage symbol
③ Shape symbol
④ Rated Capacitance symbol
⑤ Casing symbol
⑥ Plating symbol
⑤ Casing symbol
⑦ Optional symbol
⑧ Terminal symbol
⑨ Taping lead-forming symbol

①Series code

Please refer to the page of each series.

②Max operating voltage symbol

Example

Max.operating voltage (V)	Voltage symbol
2.5	2R5
2.7	2R7
3.3	3R3
3.6	3R6
5.0	5
5.5	5R5
6.3	6R3

③Shape symbol

Please refer to the page of each series.

④Rated capacitance symbol

Example

Capacitance (F)	Capacitance symbol	Capacitance (F)	Capacitance symbol
0.047	473	10	106
0.07	703	15	156
0.1	104	20	206
0.2	204	22	226
0.22	224	25	256
0.33	334	30	306
0.4	404	33	336
0.47	474	40	406
0.68	684	50	506
0.9	904	100	107
1	105	200	207
1.5	155	300	307
2.7	275	500	507
3.3	335	600	607
4.7	475	1200	128
5.6	565	1500	158
6.8	685	3000	308

⑤Casing symbol

Please refer to the page of each series.

⑥Plating symbol

Example

Symbol	Contents
U	Sn 100% plating (coin cell)
T	Sn 100% plating

⑦Optional symbol

Example

Symbol	Contents
Q	Based on AEC-Q200
M	Based on AEC-Q200

⑧Terminal symbol

Please refer to the page of each series.

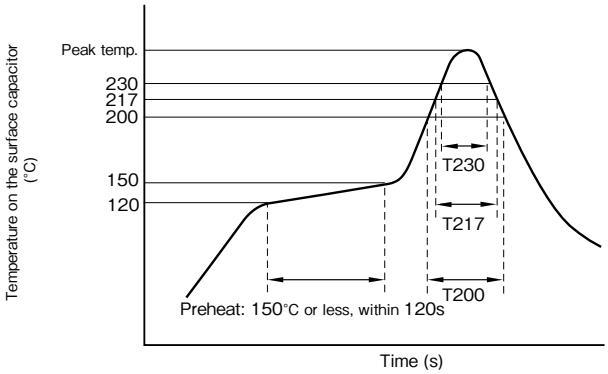
⑨Taping, Lead-forming symbol

DZ,DZH,DZN,DY,DU : Write down one of the forming symbols given on page 14 to 17 for taping and lead-forming capacitors.
DVN,DVL,DSK : Write down one of the forming symbols given on page 192 for taping capacitors.
When taping or lead-forming is not necessary, leave the boxes blank.

■ Recommended soldering method (series DS, DSK, DVN, DVL)

Reflow soldering conditions.

Profile



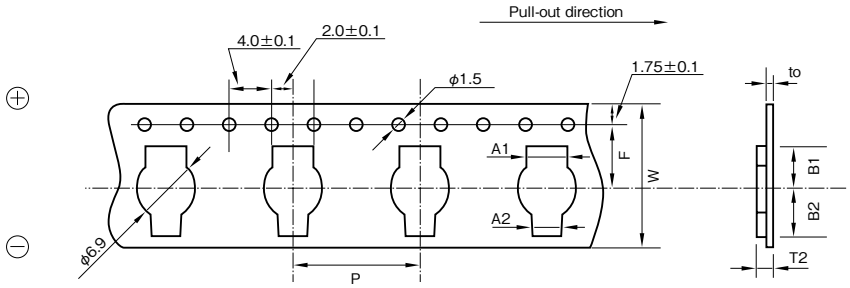
T200 : Duration while capacitor head temperature exceeds 200℃ (s)
T217 : Duration while capacitor head temperature exceeds 217℃ (s)
T230 : Duration while capacitor head temperature exceeds 230℃ (s)
The measurement temperature point is the case top

Series	Size	Peak temp. (5s Max)	T230	T217	T200	Times
DS DSK	φ4.8 to φ6.8	250℃ Max	Within 20s	Within 30s	Within 40s	2 Max
DVN DVL	φ12.5	260℃ Max	Within 20s	Within 30s	Within 50s	2 Max

Attention : Carry out soldering work at low temperature and in the shortest time within above conditions.
Do NOT reflow solder, when cell voltage is above 0.3V.
＊Please consult with us about reflow soldering conditions other than the above.

■ Taping

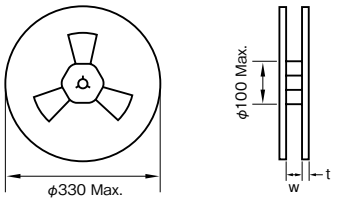
■ Carrier tape dimensions (Series DS, DSK) polarity L



(Unit : mm)

Outside size	W	P	F	A1	A2	B1	B2	T2	to	ϕD
ϕ6.8×1.4 to 2.1L	24±0.2	12.0	11.5	4.4	3.4	5.9	6.5	3.2	0.3	6.9
ϕ4.8×1.4L (Terminal shaped : HL)	16±0.2	8.0	7.5	2.4	3.6	5.0	5.1	2.45	0.3	4.9
ϕ4.8×1.4L (Terminal shaped : HR)	↑	↑	↑	3.6	2.4	5.1	5.0	↑	↑	↑

■ Reel dimensions



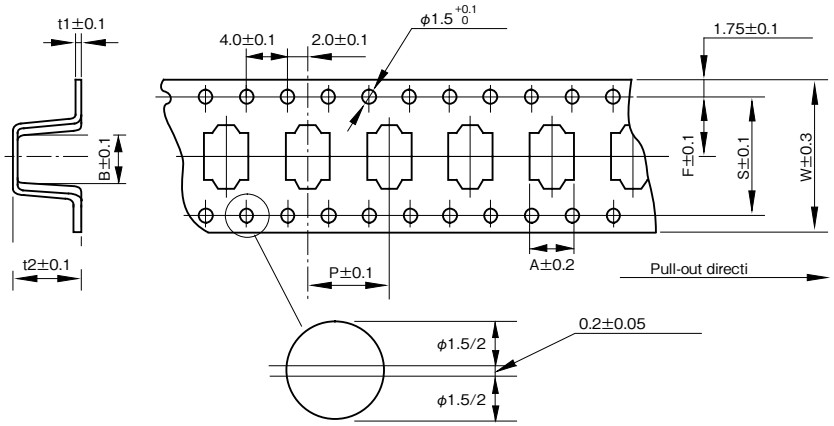
(Unit : mm)

Outside size	W	t
ϕ6.8×1.4 to 2.1L	26	3
ϕ4.8×1.4L	18	3

■ Packing quantity

Outside size	Quantity
ϕ6.8×2.1L	1500PCS.
ϕ6.8×1.4L	1500PCS. to 2000PCS.
ϕ4.8×1.4L	2000PCS.

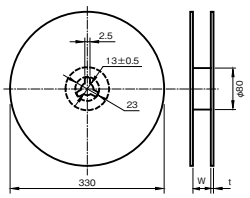
■ Carrier tape dimensions (Series DVN, DVL) polarity R



(Unit : mm)

Outside size	W	A	B	P	t2	F	t1	S
ϕ12.5×10.5L	32	13.4	13.4	24	11	14.2	0.5	28.4
ϕ12.5× 8.5L	32	13.4	13.4	24	9.5	14.2	0.5	28.4

■ Reel dimensions



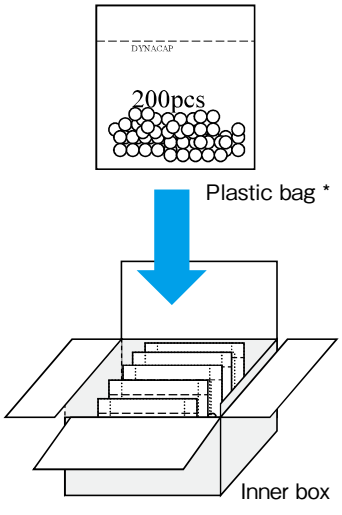
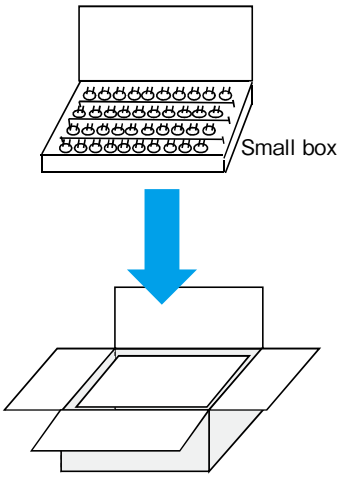
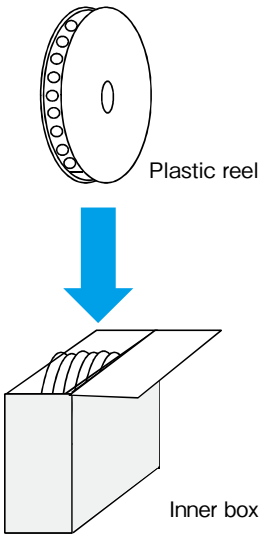
(Unit : mm)

Outside size	W	t
ϕ12.5×10.5L	34	3
ϕ12.5× 8.5L	34	3

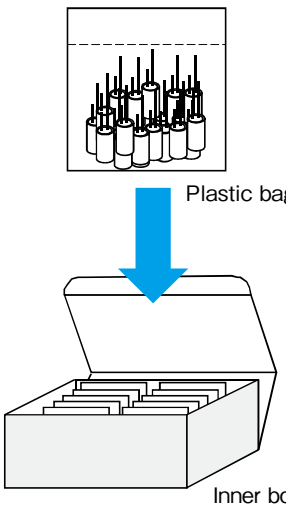
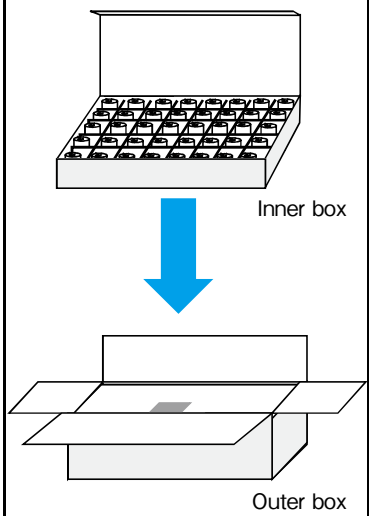
■ Packing quantity

Outside size	Quantity
ϕ12.5×10.5L	250pcs.
ϕ12.5× 8.5L	300pcs.

■ Standard packing specification of Coin cell type

Series	・DC, DCK (614, 621) ・DX, DXJ, DXN, DXS ・DB, DBN, DBJ, DBS, DK, DH, DHL, DHC (φ13.5)	・DB, DBN, DBJ, DBS, DK DH, DHL, DHC (φ21.5)	・DSK (414, 614, 621) ・DVN, DVL
Packing style	 * DC, DCK : Vacuum packing		

■ Standard packing specification of large type

Series	・DU, DY, DZ, DZN, DZH (φ6.3 to φ18) ・DZP	・DZ, DZN, DZH (φ22 or more)
Packing style		

Please inquire for details.

Cautions for Using Electric Double Layer Capacitors (DYNACAP , POWERCAP)

■ Usage

1. Electric double layer capacitors (EDLC) use a conductive organic electrolyte.

The use at excessive mounting temperature or exceeding the upper category temperature can cause the electrolyte to leak. Especially,coin and multilayer coin types for the memory backup excluding the DZ, DZH, DZN and DP series use a low elastic plastic as the sealant in the cell construction like coin batteries; therefore, avoid using such capacitors in the Vicinity of automotive equipment with steep temperature change, and heating element such as motor, relay, transformer, power IC, etc. because of the risk of leakage of electrolyte.

2. Since EDLC is polarized, do not apply a reversed voltage.

EDLC is polarized. If a reversed voltage is applied for a long time, the leakage current will increase abruptly, which may cause a decrease in the capacity, an increase in the internal resistance, and causing leakage or damage to the product in some cases.

3. Do not apply any voltage higher than the operating maximum voltage (this means the surge voltage in the case of short-time charge).

If an overvoltage is applied to the product, the leakage current will increase abruptly and the product will become overheated, which may cause a decrease in the capacity, an increase in the internal resistance, and causing leakage or damage to the product in some cases.

4. Do not use smoothing a power supply (for absorbing its ripple).

Since the internal resistance of EDLC is high, the product will be overheated if it is used for smoothing a power supply (for absorbing its ripple), which may cause a decrease in the capacity. an increase in the internal resistance, and causing leakage or damage to the product in some cases .

5. Do not use in a circuit where quick charge and discharge are repeated Very often.

In a circuit where quick charge and discharge are repeated very often , the product will become overheated, which may cause a decrease in the capacity, an increase in the internal resistance, and causing leakage or damage to the product in some cases.

Reduce the charge and discharge currents while selecting a product with low internal resistance, and rnake sure that the product surface temperature does not rise.

6. EDLC life depends heavily on the ambient temperature.

①The lifetime of EDLC is seriously affected by change in ambient temperature. If the temperature is lowered by 10℃, the lifetime will be approximately doubled. Therefore, the product should be used at a temperature lower than the guaranteed maximum value for maximum life.

②If the capacitor is used at a temperature exceeding its maximum guaranteed temperature, not only is its life shortened, but increased vapor pressure of electrolyte or electrochemical reactions may increase the internal pressure, and causing leakage or damage to the product in some cases.

7. Note that a voltage drop In EDLC occurs during backup.

In a case where discharge current is large, or a large current flows instantaneously. an electric double layer capacitor may not operate at the start of discharge because of a large voltage drop (IR drop) caused by the product with the DC internal resistance.

Please consult us for a large discharge current (in the case of other series except DZ, DZH, DZN and DP series: when larger than 1〔mA〕＝1×C〔F〕)as the internal resistance varies by each series (Recommendation discharge current: less than 1 mA/F at 20℃)

8. Do not use the product in an ambient atomsphere containing waterdrops (condensation) or toxic gases.

Although EDLC is sealed, water droplets or toxic gases may do degradation characteristics, a leakage and corrode the lead wires and the case, which may cause a breaking of the wires.

Avoid abrupt temperature changes, which may cause water droplets, resulting in product deterioration and electrolyte leakage.

9. Contact us before connecting the products in series.

A series connection will cause imbalance in the voltage, charged to the capacitors and an overvoltage may be charged to one or more them. This may cause a decrease in the capacity, an increase in the internal resistance and causing leakage or damage to the product in some cases. When using series connection for several capacitors, please derate the applied voltage from the operating maximum voltage or use balancing circuits (bleeder resistor, etc.) to compensate for the imbalance in the applied voltage for each capacitor Moreover, please ensure the arrangement does not cause temperature fluctuation between capacitors.

10. About vibration.

A terminal blank, a terminal bend, and a crease may occur by adding too much vibration to a capacitor.

Moreover, depending on the case, an EDLC may do degradation of the characteristic, breakage, and a leakage.

When you become too much vibration, please contact us.

11. When used on a double sided printed circuit board, do not overlap the wiring patterns on the mounted part.

A short circuit may be created by certain wiring conditions. Should the electrolyte leaks, the circuit pattern may cause a short circuit, resulting in tracking or migration.

12. Do not keep In high temperature and high humidity atmospheres.

①Avoid high temperature or high humidity or direct rays when storing capacitors.

②Keep the product in a place where the temperature is 5℃ to 30℃ and the humidity is lower than 60%. Avoid an abrupt temperature change, which may cause condensation or deterioration of the product or liquid leakage.
③Do not store EDLC at a place where there is a possibility that they may get water, salt or oil spill.
④Do not store EDLC at place where the air contains dense hazardous gas (hydrogen sulfide, sulfurous acid, nitrous acid, chlorine ammonia, etc.).
⑤Do not store EDLC at a place where it gets ultraviolet ray or radioactive ray.

13. Capacitors fitted with a relief valve

①The relief valve is provided with a valve function with part of the case made thin to avoid explosion by increased internal pressure when the capacitor is under abnormal load such as overvoltage or reverse voltage. After activation of the relief valve, the capacitor must be replaced as it does not restore.
②For the capacitors with a case relief valve (series DZ,DZH,DZN,DZP,DU,DY), provide a void on the top of the relief valve so as not to hamper its activation. Make a void of 2 mm or more for the product of ϕ18 or less in diameter, and a void of 3 mm or more for the product of ϕ20 to ϕ35 mm in diameter on the top.

14. Use at a high altitude

The use of capacitors at high altitudes such as on an airplane causes a large difference between the internal pressure of the capacitors and the atmospheric pressure.
However, there is no problem in use under atmospheric pressure up to about an altitude of 10,000 meters.
If the condition is severe like space, please contact us.

■Mounting

1. Do not overheat when soldered.

Depending on the type and size of the board, the product may be subjected to overheat, leading to loss of airtightness. This may greatly shorten the product life or cause liquid leakage.
In case of a 1.6mm-thick and single side printed board. for example, keep the following soldering conditions: temperature lower then 260℃, time shorter than 5 seconds.
When a board thinner than 1.6 mm or multi-layer printed board is used, contact us.
In the case of hand soldering, the iron tip temperature is lower than 360℃, time is shorter than 3 seconds.
The coin types and multilayer coin types excluding the DZ and reflow-compatible coin types use polypropylene as the packing material for sealing and therefore susceptible to excessive heat. Note that the component body temperature shall be controlled so as not to exceed 90℃ including preheating.

2. When soldering the capacitor to the wiring board, do not attach the body of the capacitor to the circuit board.

If the body of the capacitor is attached directly to the circuit board, the flux or solder can blow through the through holes in the circuit board, negatively impacting the capacitor.
Moreover, the heat influence at the time of soldering can be reduced by floating the body.

3. Contact us when cleaning is necessary after soldering.

Certain types of solvents are not compatible and may cause damage.

4. Contact us when the product Is attached by adhesive bonding.

Certain types of adhesives are not compatible.
Paste bond partially between the product and the board so that the product will not adhere completely to the board.
Do not raise the temperature over the guaranteed value while the bond is hardening.

5. Heating conditions of adhesive curing oven

During heating of the adhesive curing oven, application of excessive heat may significantly shorten the product life or cause liquid leakage. Control the body temperature so as not to exceed 90℃ during work while setting the allowable atmospheric temperature below 110℃, and allowable heating time within 30 seconds.
For the heating conditions deviating from the above, consult with us providing your temperature profile conditions.

6. Be careful not to apply an excessive force to the capacitor body, terminals or lead wires.

①Mount the capacitor while making sure that the terminal spacing of the capacitor and the spacing of the holes in the printed wiring board are aligned.
②If the capacitor body is subjected to stress such as grabbing, falling, bend, pushing or twisting after mounted, its terminals may come off, leading to open, short or liquid leakage.

■Other cautions

1. Emergency procedures

If the EDLC overheats or starts to smell, immediately switch off the units main power supply to stop operation.
Keep your face and hands away from the EDLC, since the temperature may be high enough to cause the EDLC to ignite and burn.

2. Periodical inspections should be established for the EDLC used in industrial appliances.

The following items should be checked:
①Appearance : Check if there is leakage.
②Electronic performance : Check the leakage current, the electrostatic, the internal resistance and other items described in the catalog or the product specifications.

3. Disposing of EDLC

①Punch a hole or crush the EDLC (to prevent explosion) before incineration at approved facility.
②If they are not to be incinerated, bring them to a professional industrial waste disposal company.

4. Other notes

Please refer to the following literature for anything not described in the product specifications or the catalog. (Technical Report of Japan Electronics and Information Technology Industries Association #EIAJ RCR-2370B “Guideline of notabilia for fixed electric double layer capacitors”)

DVN ELECTRIC DOUBLE LAYER CAPACITORS "DYNACAP"

ELNA®

5.5V SMD, Low Resistance Capacitors

GREEN CAP | 70°C

- Size : φ12.5×8.5mm, compatible with surface mounting and low ESR.
- Unlike batteries, safe and high reliability without containing active and hazardous substance.
- Unlike batteries, excellent charge and discharge characteristics with no chemical reactions.
- Responds to temperature 260℃ during the reflow peek.

Marking color : White print on an brown sleeve

Convert to chip

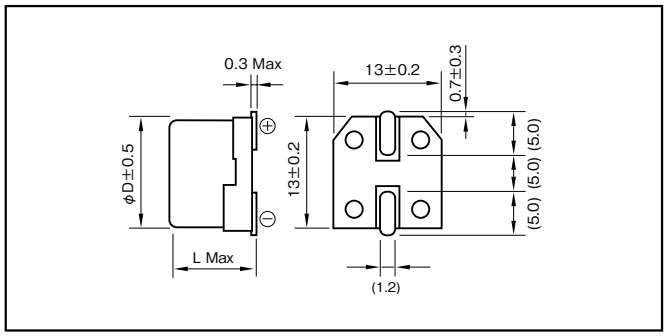
DVN ⇦ DBN

Specifications

Item	Performance				
Category temperature range (℃)	− 25 to +70				
Tolerance at rated capacitance (%)	− 20 to +80				
Internal resistance at 1 kHz	Rated capacitance (F)	0.047	0.1	0.22	0.33
	Internal resistance (Ω Max.)	30	30	30	30
Characteristics at high and low temperature	Percentage of capacitance change	Within ±30% of the value at 20℃			
	Internal resistance	Less than five times of the value at 20℃			
Endurance (70℃)	Test time	1000 hours			
	Percentage of capacitance change	Within ±30% of the initial measured value			
	Internal resistance	Less than four times of the initial specified value			
Shelf life (70℃)	Test time : 1000 hours ; Same as endurance.				
Applicable standards	Conforms to JIS C5160-1 2009 (IEC 62391-1 2006)				

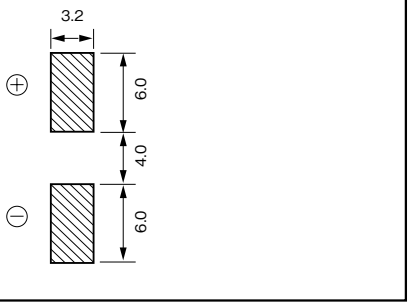
Outline Drawing

Unit : mm



Recommended land pattern size

Unit : mm



Part numbering system (example : 5.5V0.1F)

DVN	—	5R5	D	104	T	—	R5
Series code		Max. operating voltage symbol	Terminal code	Rated capacitance symbol			Taping symbol

Part number is refer to following table.

Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	ELNA Parts No.	φD×L (mm)
5.5	0.047	DVN-5R5D473T-R5	12.5×8.5
5.5	0.1	DVN-5R5D104T-R5	12.5×8.5
5.5	0.22	DVN-5R5D224T-R5	12.5×8.5
5.5	0.33	DVN-5R5D334T-R5	12.5×8.5

*soldering conditions are described on page 191.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

5.5V SMD, Wide Temperature range Capacitors

GREEN CAP | 85°C

- Size : φ12.5×10.5mm, compatible with surface mounting.
- Wide temperature range (−40 to 85℃), Low ESR.
- Unlike batteries, safe and high reliability without containing active and hazardous substance.
- Unlike batteries, excellent charge and discharge characteristics with no chemical reactions.
- Responds to temperature 260℃ during the reflow peek.

Marking color : White print on an brown sleeve

Convert to chip

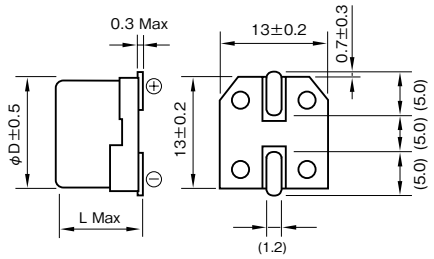
DVL ⇦ DHL

Specifications

Item	Performance			
Category temperature range (℃)	− 40 to +85			
Tolerance at rated capacitance (%)	− 20 to +80			
Internal resistance at 1 kHz	Rated capacitance (F)	0.047	0.1	0.22
	Internal resistance (Ω Max.)	45	45	45
Characteristics at high and low temperature	Percentage of capacitance change	Within ±30% of the value at 20℃		
	Internal resistance	−40℃ : Less than seven times of the value at 20℃ 85℃ : Less than five times of the value at 20℃		
Endurance (85℃)	Test time	1000 hours		
	Percentage of capacitance change	Within ±30% of the initial measured value		
	Internal resistance	Less than four times of the initial specified value		
Shelf life (85℃)	Test time : 1000 hours ; Same as endurance.			
Applicable standards	Conforms to JIS C5160-1 2009 (IEC 62391-1 2006)			

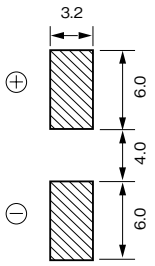
Outline Drawing

Unit : mm



Recommended land pattern size

Unit : mm



Part numbering system (example : 5.5V0.1F)

DVL	—	5R5	D	104	T	—	R5
Series code		Max. operating voltage symbol	Terminal code	Rated capacitance symbol			Taping symbol

Part number is refer to following table.

Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	ELNA Parts No.	φD×L (mm)
5.5	0.047	DVL-5R5D473T-R5	12.5×10.5
5.5	0.1	DVL-5R5D104T-R5	12.5×10.5
5.5	0.22	DVL-5R5D224T-R5	12.5×10.5

*soldering conditions are described on page 191.

DB, DBN ELECTRIC DOUBLE LAYER CAPACITORS "DYNACAP"

ELNA®

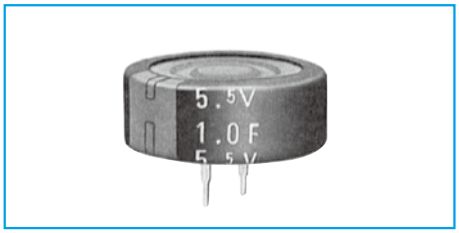
5.5V Standard Capacitors Series DB

GREEN CAP | 70°C

- Small-sized, large capacity, excellent voltage holding.
- For all ratings, uniform 5mm pitch of terminal spacing.
- Wider temperature range (−25 to +70°C) than battery.
- φ21.5×7.5L size can encase up to 1.5F.
- Ideal for backing up of CMOS's, IC's, microcomputers, RAM's, RTC's and the like used in Video's, tuners, TV sets, telephone sets and others.

Low resistance

DBN ⇦ DB



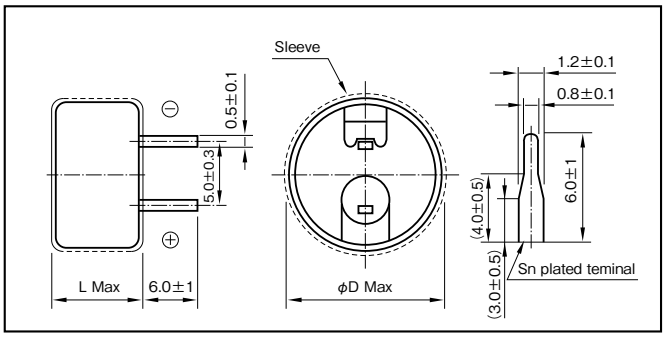
Marking color : White print on an indigo sleeve

Specifications

Item	Performance
Category temperature range (℃)	−25 to +70
Tolerance at rated capacitance (%)	−20 to +80
Internal resistance at 1 kHz	Rated capacitance (F): 0.047 / 0.1 / 0.22 / 0.33 / 0.47 / 0.47 / 1 / 1.5 Internal resistance (Ω Max.): 120 / 75 / 75 / 75 / 75(φ13.5) / 30(φ21.5) / 30 / 30
Characteristics at high and low temperature	Percentage of capacitance change: Within ±30% of the value at 20℃ Internal resistance: Less than five times of the value at 20℃
Endurance (70℃)	Test time: 1000 hours Percentage of capacitance change: Within ±30% of the initial measured value Internal resistance: Within four times of the initial specified value
Shelf life (70℃)	Test time : 1000 hours ; Same as endurance.
Applicable standards	Conforms to JIS C5160-1 2009 (IEC 62391-1 2006)

Outline Drawing

Unit : mm



Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	ELNA Parts No.	φD×L (mm)
5.5	0.047	DB-5R5D473T	13.5×7.5
5.5	0.1	DB-5R5D104T	13.5×7.5
5.5	0.22	DB-5R5D224T	13.5×7.5
5.5	0.33	DB-5R5D334T	13.5×7.5
5.5	0.47	DB-5R5D474ST	13.5×7.5
5.5	0.47	DB-5R5D474T	21.5×8.0
5.5	1	DB-5R5D105T	21.5×8.0
5.5	1.5	DB-5R5D155T	21.5×8.0

Part numbering system (example : 5.5V0.1F)

DB	—	5R5	D	104	□	T
Series code		Max. operating voltage symbol	Terminal code	Reted capacitance symbol	Additional symbol	

Part number is refer to above table.

5.5V Low Resistance Series DBN

GREEN CAP | 70°C | Low ESR

- Internal resistance was reduced to 85% to DB series.
- It excels in rapid charge.(It can charge and discharge with 1.5 times as much current (mA) as rated capacitance.)

Specifications

Item	Performance
Category temperature range (℃)	−25 to +70
Tolerance at rated capacitance (%)	−20 to +80
Internal resistance at 1 kHz	Rated capacitance (F): 0.047 / 0.1 / 0.22 / 0.33 / 0.47 / 0.47 / 1 / 1.5 Internal resistance (Ω): 25 / 25 / 25 / 25 / 25(φ13.5) / 20(φ21.5) / 20 / 20
Characteristics at high and low temperature	Percentage of capacitance change: Within ±30% of the value at 20℃ Internal resistance: Less than five times of the value at 20℃
Endurance (70℃)	Test time: 1000 hours Percentage of capacitance change: Within ±30% of the initial measured value Internal resistance: Within four times of the initial specified value
Shelf life (70℃)	Test time : 1000 hours ; Same as endurance.
Applicable standards	Conforms to JIS C5160-1 2009 (IEC 62391-1 2006)

Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	ELNA Parts No.	φD×L (mm)
5.5	0.047	DBN-5R5D473T	13.5×7.5
5.5	0.1	DBN-5R5D104T	13.5×7.5
5.5	0.22	DBN-5R5D224T	13.5×7.5
5.5	0.33	DBN-5R5D334T	13.5×7.5
5.5	0.47	DBN-5R5D474ST	13.5×7.5
5.5	0.47	DBN-5R5D474T	21.5×8.0
5.5	1	DBN-5R5D105T	21.5×8.0
5.5	1.5	DBN-5R5D155T	21.5×8.0

Part numbering system (example : 5.5V0.047F)

DBN	—	5R5	D	473	□	T
Series code		Max. operating voltage symbol	Terminal code	Reted capacitance symbol	Additional symbol	

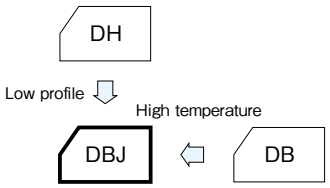
Part number is refer to left table.

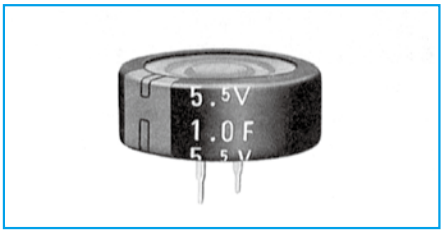
NOTE : Design, Specifications are subject to change without notice. It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

5.5V Low Profile and High Temperature Capacitors

GREEN CAP | 85°C

- High temperature type of series DB.
- Small-sized, large capacity, excellent voltage holding.
- For all ratings, uniform 5mm pitch of terminal spacing.
- φ13.5×7.5L size can encase up to 0.33F.
- Ideal for backing up of CMOS's, IC's, microcomputers, RAM's, RTC's and the like used in Video's, tuners, TV sets, telephone sets and others.





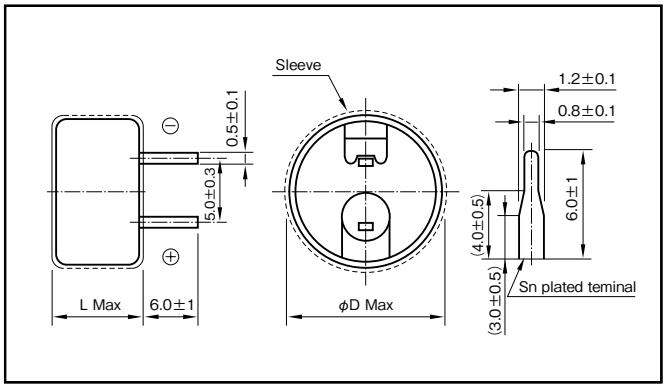
Marking color : White print on a black sleeve

Specifications

Item	Performance						
Category temperature range (℃)	−10 to +85						
Tolerance at rated capacitance (%)	−20 to +80						
Internal resistance at 1 kHz	Rated capacitance (F)	0.047	0.1	0.22	0.33	0.47	1
	Internal resistance (Ω Max.)	200	150	150	150	100	75
Characteristics at high and low temperature	Percentage of capacitance change	Within ±30% of the value at 20℃					
	Internal resistance	Less than four times of the initial specified value.					
Endurance (85℃)	Test time	1000 hours					
	Percentage of capacitance change	Within ±30% of the initial measured value					
	Internal resistance	Less than four times of the initial specified value					
Shelf life (85℃)	Test time : 1000 hours ; Same as endurance.						
Applicable standards	Conforms to JIS C5160-1 2009 (IEC 62391-1 2006)						

Outline Drawing

Unit : mm



Part numbering system (example : 5.5V0.1F)

DBJ	—	5R5	D	104	T
Series code		Max.operating voltage symbol		Rated capacitance symbol	

Part number is refer to following table.

Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	ELNA Parts No.	φD×L (mm)
5.5	0.047	DBJ-5R5D473T	13.5×7.5
5.5	0.1	DBJ-5R5D104T	13.5×7.5
5.5	0.22	DBJ-5R5D224T	13.5×7.5
5.5	0.33	DBJ-5R5D334T	13.5×7.5
5.5	0.47	DBJ-5R5D474T	21.5×8.0
5.5	1	DBJ-5R5D105T	21.5×8.0

3.6V Low Profile and Low ESR High Temperature Capacitors

GREEN CAP | 85°C

- Long life of 3.6V 2000 hours in small size low ESR.
- For all ratings, uniform 5mm pitch of terminal spacing.
- Wider temperature range (−25 to +85℃) than battery.
- φ13.5×7.5L size can encase up to 0.47F.
- Ideal for backing up of CMOS's, IC's, microcomputers, RAM's, RTC's and the like used in Video's, tuners, TV sets, telephone sets and others.
- It excels in rapid charge.

Low voltage
High temperature

DBS ⇦ DBN

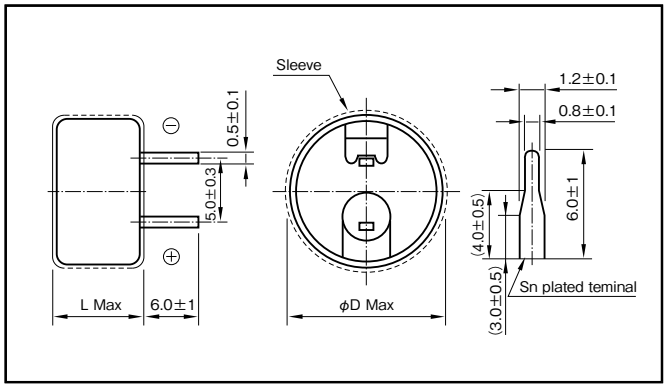
Marking color : White print on a black sleeve

Specifications

Item	Performance						
Category temperature range (℃)	−25 to +85						
Tolerance at rated capacitance (%)	−20 to +80						
Internal resistance at 1 kHz	Rated capacitance (F)	0.047	0.1	0.22	0.33	0.47	0.47	1
	Internal resistance (Ω Max.)	25	25	25	25	25(φ13.5)	20(φ21.5)	20
Characteristics at high and low temperature	Percentage of capacitance change	Within ±30% of the value at 20℃						
	Internal resistance	Less than five times of the value at 20℃						
Endurance (85℃)	Test time	2000 hours (φ13.5 0.47F : 1000 hours)						
	Percentage of capacitance change	Within ±30% of the initial measured value						
	Internal resistance	Within four times of the initial specified value						
Shelf life (85℃)	Test time : 1000 hours ; Same as endurance.							
Applicable standards	Conforms to JIS C5160-1 2009 (IEC 62391-1 2006)							

Outline Drawing

Unit : mm



Part numbering system (example : 3.6V0.1F)

DBS	—	3R6	D	104	□	T
Series code		Max. operating voltage symbol	Terminal code	Reted capacitance symbol	Additional symbol	

Part number is refer to following table.

Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	ELNA Parts No.	φD×L (mm)
3.6	0.047	DBS-3R6D473T	13.5×7.5
3.6	0.1	DBS-3R6D104T	13.5×7.5
3.6	0.22	DBS-3R6D224T	13.5×7.5
3.6	0.33	DBS-3R6D334T	13.5×7.5
3.6	0.47	DBS-3R6D474ST	13.5×7.5
3.6	0.47	DBS-3R6D474T	21.5×8.0
3.6	1	DBS-3R6D105T	21.5×8.0

5.5V Miniaturized Standard Capacitors

GREEN CAP | 70°C

- Smaller and lighter than Series DB.
- 5mm tall. Max. thin profile (H-shaped).
- Miniaturized but can encase up to 0.47F in 11.5×5mm case, and 1.5F in φ19.0×20.5Lmm case.

Miniaturized

DX ⇦ DB

Marking color : White print on an indigo sleeve

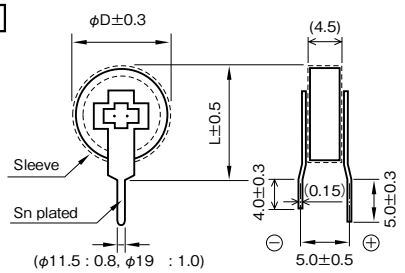
Specifications

Item	Performance
Category temperature range (℃)	−25 to +70
Tolerance at rated capacitance (%)	−20 to +80
Internal resistance at 1 kHz	Rated capacitance (F): 0.047 / 0.1 / 0.22 / 0.33 / 0.47 / 0.47 / 1 / 1.5 Internal resistance (Ω Max.): 120 / 75 / 75 / 75 / 75(φ11.5) / 30(φ19.0) / 30 / 30
Characteristics at high and low temperature	Percentage of capacitance change: Within ±30% of the value at 20℃ Internal resistance: Less than five times of the value at 20℃
Endurance (70℃)	Test time: 1000 hours Percentage of capacitance change: Within ±30% of the initial measured value Internal resistance: Less than four times of the initial specified value
Shelf life (70℃)	Test time : 1000 hours ; Same as endurance.
Applicable standards	Conforms to JIS C5160-1 2009 (IEC 62391-1 2006)

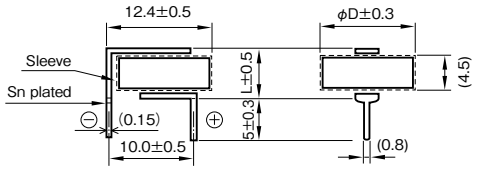
Outline Drawing

Unit : mm

Terminal shaped : V



Terminal shaped : H



Part numbering system (example : 5.5V0.1F)

DX	—	5R5	□	104	□	U
Series code		Max.operating voltage symbol	Terminal code	Reted capacitance symbol	Additional symbol	

Part number is refer to following table.

Note

Do not apply external force to products or terminals as stress such as twisting, bending, pushing, or falling of such products or terminals may remove the terminals, resulting in an open/short circuit or liquid leakage.
Avoid applying excessive heat to capacitors during heating of an adhesive curing oven. For details, refer to the precautions in use of DYNACAP.

Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	ELNA Parts No.	φD×L (mm)
5.5	0.047	DX-5R5V473U	11.5×13.0
		DX-5R5H473U	11.5× 5.0
5.5	0.1	DX-5R5V104U	11.5×13.0
		DX-5R5H104U	11.5× 5.0
5.5	0.22	DX-5R5V224U	11.5×13.0
		DX-5R5H224U	11.5× 5.0
5.5	0.33	DX-5R5V334U	11.5×13.0
		DX-5R5H334U	11.5× 5.0
5.5	0.47	DX-5R5V474SU	11.5×13.0
		DX-5R5H474SU	11.5× 5.0
		DX-5R5V474U	19.0×20.5
5.5	1	DX-5R5V105U	19.0×20.5
5.5	1.5	DX-5R5V155U	19.0×20.5

EDLC

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

5.5V Miniaturized Low Resistance Capacitors

GREEN CAP | 70°C

- Internal resistance was reduced to 85% to DX series and this size.
- 5mm tall. Max. thin profile (H-shaped).
- Miniaturized but can encase up to 0.47F in 11.5×5mm case, and 1.5F in φ19.0×20.5Lmm case.
- It excels in rapid charge.

(It can charge and discharge with 1.5 times as much current (mA) as rated capacitance.)

Low resistance

DXN ⇦ DX

Marking color : White print on an indigo sleeve

Specifications

Item	Performance
Category temperature range (℃)	−25 to +70
Tolerance at rated capacitance (%)	−20 to +80
Internal resistance at 1 kHz	See table below
Characteristics at high and low temperature	See table below
Endurance (70℃)	See table below
Shelf life (70℃)	Test time : 1000 hours ; Same as endurance.
Applicable standards	Conforms to JIS C5160-1 2009(IEC 62391-1 2006)

Internal resistance at 1 kHz

Rated capacitance (F)	0.047	0.1	0.22	0.33	0.47	0.47	1	1.5
Internal resistance (Ω Max.)	25	25	25	25	25(φ11.5)	20(φ19.0)	20	20

Characteristics at high and low temperature

Percentage of capacitance change	Within ±30% of the value at 20℃
Internal resistance	Less than five times of the value at 20℃

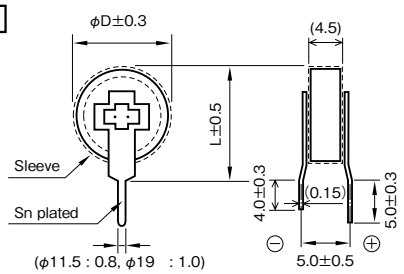
Endurance (70℃)

Test time	1000 hours
Percentage of capacitance change	Within ±30% of the initial measured value
Internal resistance	Less than four times of the initial specified value

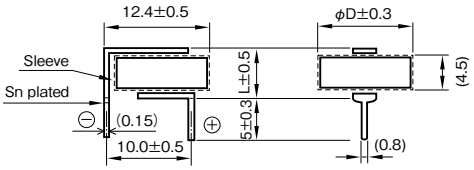
Outline Drawing

Unit : mm

Terminal shaped : V



Terminal shaped : H



Part numbering system (example : 5.5V0.1F)

DXN	—	5R5	□	104	□	U
Series code		Max.operating voltage symbol	Terminal code	Rated Capacitance symbol	Additional symbol	

Part number is refer to following table.

Note

Do not apply external force to products or terminals as stress such as twisting, bending, pushing, or falling of such products or terminals may remove the terminals, resulting in an open/short circuit or liquid leakage.
Avoid applying excessive heat to capacitors during heating of an adhesive curing oven.
For details, refer to the precautions in use of DYNACAP.

Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	ELNA Parts No.	φD×L (mm)
5.5	0.047	DXN-5R5V473U	11.5×13.0
		DXN-5R5H473U	11.5× 5.0
5.5	0.1	DXN-5R5V104U	11.5×13.0
		DXN-5R5H104U	11.5× 5.0
5.5	0.22	DXN-5R5V224U	11.5×13.0
		DXN-5R5H224U	11.5× 5.0
5.5	0.33	DXN-5R5V334U	11.5×13.0
		DXN-5R5H334U	11.5× 5.0
5.5	0.47	DXN-5R5V474SU	11.5×13.0
		DXN-5R5H474SU	11.5× 5.0
		DXN-5R5V474U	19.0×20.5
5.5	1	DXN-5R5V105U	19.0×20.5
5.5	1.5	DXN-5R5V155U	19.0×20.5

5.5V Miniaturized High Temperature Capacitors

GREEN CAP | 85℃

- High temperature type of Series DX.
- 5mm tall. Max. thin profile (H-shaped).
- Miniaturized but can encase up to 0.33F in 11.5×5mm case, and 1.0F in φ19.0×20.5Lmm case.

High temperature

DXJ ⇦ DX

Marking color : White print on a black sleeve

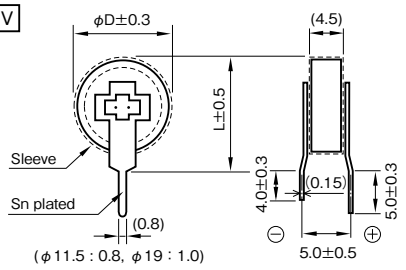
Specifications

Item	Performance					
Category temperature range (℃)	−10 to +85					
Tolerance at rated capacitance (%)	−20 to +80					
Internal resistance at 1 kHz	Rated capacitance (F)	0.047	0.1	0.22	0.33	1
	Internal resistance (Ω Max.)	200	150	150	150	75
Characteristics at high and low temperature	Percentage of capacitance change	Within ±30% of the value at 20℃				
	Internal resistance	Less than four times of the initial specified value.				
Endurance (85℃)	Test time	1000 hours				
	Percentage of capacitance change	Within ±30% of the initial measured value				
	Internal resistance	Less than four times of the initial specified value				
Shelf life (85℃)	Test time : 1000 hours ; Same as endurance.					
Applicable standards	Conforms to JIS C5160-1 2009 (IEC 62391-1 2006)					

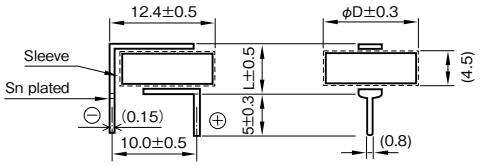
Outline Drawing

Unit : mm

Terminal shaped : V



Terminal shaped : H



Part numbering system (example : 5.5V0.1F)

DXJ	—	5R5	□	104	□	U
Series code		Max.operating voltage symbol	Terminal code	Rated Capacitance symbol	Additional symbol	

Part number is refer to following table.

Note

Do not apply external force to products or terminals as stress such as twisting, bending, pushing, or falling of such products or terminals may remove the terminals, resulting in an open/short circuit or liquid leakage.
Avoid applying excessive heat to capacitors during heating of an adhesive curing oven. For details, refer to the precautions in use of DYNACAP.

Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	ELNA Parts No.	φD×L (mm)
5.5	0.047	DXJ-5R5V473U	11.5×13.0
		DXJ-5R5H473U	11.5× 5.0
5.5	0.1	DXJ-5R5V104U	11.5×13.0
		DXJ-5R5H104U	11.5× 5.0
5.5	0.22	DXJ-5R5V224U	11.5×13.0
		DXJ-5R5H224U	11.5× 5.0
5.5	0.33	DXJ-5R5V334U	11.5×13.0
		DXJ-5R5H334U	11.5× 5.0
5.5	1	DXJ-5R5V105U	19.0×20.5

EDLC

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

3.6V Miniaturized Low ESR High Temperature Capacitors

GREEN CAP | 85°C

- Long life of 3.6V 2000 hours, low ESR in DX series and this size.
- 5mm tall. Max. thin profile (H-shaped).
- Wider temperature range (−25 to +85°C) than battery.
- Miniaturized but can encase up to 0.47F in 11.5×5mm case and 1.0F in 19.0×20.5L mm case.
- It excels in rapid charge.

Low voltage
High temperature

DXS ⇦ DXN

Marking color : White print on a black sleeve

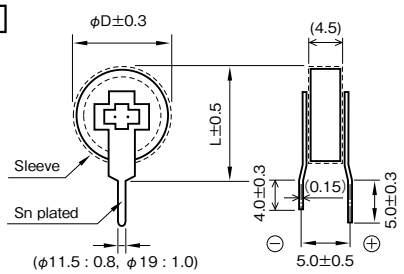
Specifications

Item	Performance
Category temperature range (℃)	−25 to +85
Tolerance at rated capacitance (%)	−20 to +80
Internal resistance at 1 kHz	Rated capacitance (F): 0.047 / 0.1 / 0.22 / 0.33 / 0.47 / 0.47 / 1 Internal resistance (Ω Max.): 25 / 25 / 25 / 25 / 25 (φ11.5) / 20 (φ19.0) / 20
Characteristics at high and low temperature	Percentage of capacitance change: Within ±30% of the value at 20℃ Internal resistance: Less than five times of the value at 20℃
Endurance (85℃)	Test time: 2000 hours (φ11.5 0.47F : 1000 hours) Percentage of capacitance change: Within ±30% of the initial measured value Internal resistance: Less than four times of the initial specified value
Shelf life (85℃)	Test time : 1000 hours ; Same as endurance.
Applicable standards	Conforms to JIS C5160-1 2009(IEC 62391-1 2006)

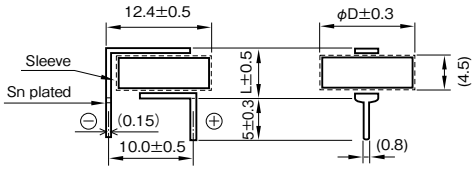
Outline Drawing

Unit : mm

Terminal shaped : V



Terminal shaped : H



Part numbering system (example : 3.6V0.1F)

DXS	—	3R6	□	104	□	U
Series code		Max.operating voltage symbol	Terminal shaped	Rated capacitance symbol	Additional symbol	

Part number is refer to following table.

Note

Do not apply external force to products or terminals as stress such as twisting, bending, pushing, or falling of such products or terminals may remove the terminals, resulting in an open/short circuit or liquid leakage.
Avoid applying excessive heat to capacitors during heating of an adhesive curing oven.
For details, refer to the precautions in use of DYNACAP.

DXS-5R5V105U

Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	ELNA Parts No.	φD×L (mm)
3.6	0.047	DXS-3R6V473U	11.5×13.0
		DXS-3R6H473U	11.5× 5.0
3.6	0.1	DXS-3R6V104U	11.5×13.0
		DXS-3R6H104U	11.5× 5.0
3.6	0.22	DXS-3R6V224U	11.5×13.0
		DXS-3R6H224U	11.5× 5.0
3.6	0.33	DXS-3R6V334U	11.5×13.0
		DXS-3R6H334U	11.5× 5.0
3.6	0.47	DXS-3R6V474SU	11.5×13.0
		DXS-3R6H474SU	11.5× 5.0
		DXS-3R6V474U	19.0×20.5
3.6	1	DXS-3R6V105U	19.0×20.5

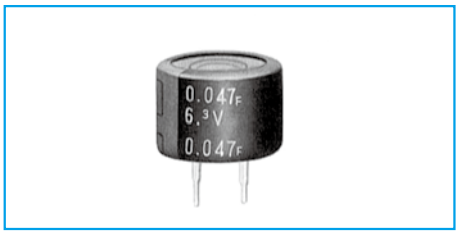
High Voltage Tolerance Capacitors

GREEN CAP | 70°C

- High voltage tolerant (6.3V guaranteed) and highly reliable.
- Ideal for backing up of Li-battery-backed equipment such as cameras, video and telephone sets.

Miniaturized ⇦ High voltage tolerant ⇨

DX ⇦ DB ⇨ **DK**



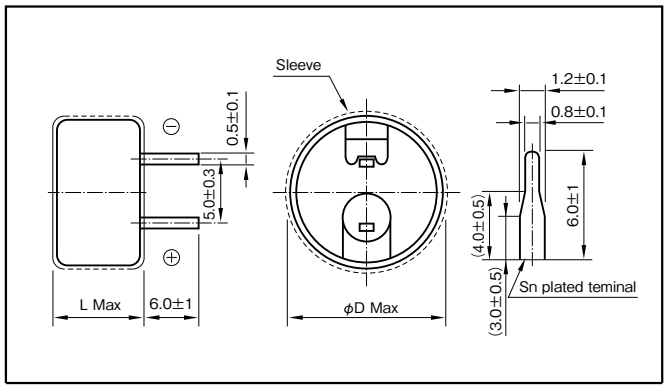
Marking color : White print on an indigo sleeve

Specifications

Item	Performance					
Category temperature range (°C)	−25 to +70					
Tolerance at rated capacitance (%)	−20 to +80					
Internal resistance at 1 kHz	Rated capacitance (F)	0.047	0.1	0.47	0.68	1
	Internal resistance (Ω Max.)	300	200	50	50	30
Characteristics at high and low temperature	Percentage of capacitance change	Within ±30% of the value at 20°C				
	Internal resistance	Less than five times of the value at 20°C				
Endurance (70°C)	Test time	1000 hours				
	Percentage of capacitance change	Within ±30% of the initial measured value				
	Internal resistance	Less than four times of the initial specified value				
Shelf life (70°C)	Test time : 1000 hours ; Same as endurance.					
Applicable standards	Conforms to JIS C5160-1 2009 (IEC 62391-1 2006)					

Outline Drawing

Unit : mm



Part numbering system (example : 6.3V0.1F)

DK	—	6R3	D	104	T
Series code		Max.operating voltage symbol		Rated capacitance symbol	

Part number is refer to following table.

Standard Ratings

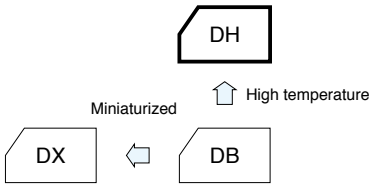
Max. operating voltage (V)	Rated capacitance (F)	ELNA Parts No.	φD×L (mm)
6.3	0.047	DK-6R3D473T	13.5×9.5
6.3	0.1	DK-6R3D104T	13.5×9.5
6.3	0.47	DK-6R3D474T	21.5×9.5
6.3	0.68	DK-6R3D684T	21.5×9.5
6.3	1	DK-6R3D105T	21.5×9.5

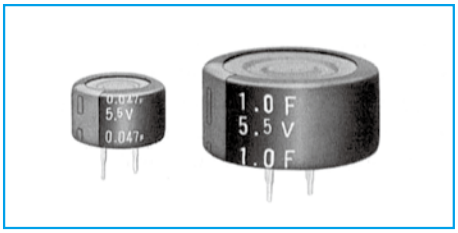
NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

High Temperature Capacitors

GREEN CAP | 85°C

- High temperature tolerant (−25 to +85℃) and highly reliable.
- Ideal for backing up of controls, electronic rice cooking jars, home bakeries and the like.





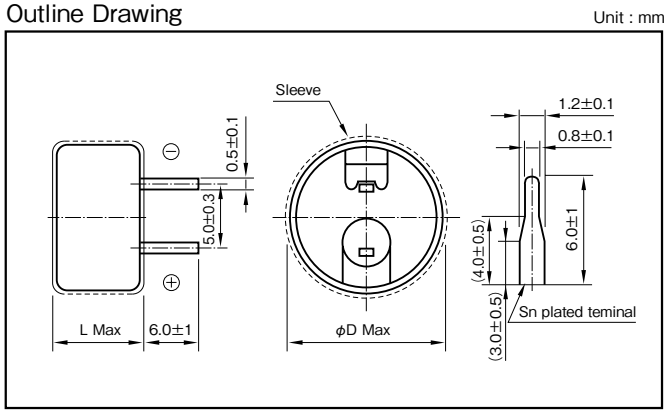
Marking color : White print on an indigo sleeve

Specifications

Item	Performance
Category temperature range (℃)	−25 to +85
Tolerance at rated capacitance (%)	−20 to +80
Internal resistance at 1 kHz	Rated capacitance (F): 0.047 / 0.1 / 0.22 / 0.47 / 0.68 / 1 Internal resistance (Ω Max.): 300 / 200 / 120 / 50 / 50 / 30
Characteristics at high and low temperature	Percentage of capacitance change: Within ±30% of the value at 20℃ Internal resistance: Less than five times of the value at 20℃
Endurance (85℃)	Test time: 1000 hours Percentage of capacitance change: Within ±30% of the initial measured value Internal resistance: Less than four times of the initial specified value
Shelf life (85℃)	Test time : 1000 hours ; Same as endurance.
Applicable standards	Conforms to JIS C5160-1 2009 (IEC 62391-1 2006)

Outline Drawing

Unit : mm



Part numbering system (example : 5.5V0.1F)

DH — 5R5 D 104 T

- DH: Series code
- 5R5: Max.operating voltage symbol
- 104: Rated capacitance symbol

Part number is refer to following table.

Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	ELNA Parts No.	ϕD×L (mm)
5.5	0.047	DH-5R5D473T	13.5×9.5
5.5	0.1	DH-5R5D104T	13.5×9.5
5.5	0.22	DH-5R5D224T	13.5×9.5
5.5	0.47	DH-5R5D474T	21.5×9.5
5.5	0.68	DH-5R5D684T	21.5×9.5
5.5	1	DH-5R5D105T	21.5×9.5

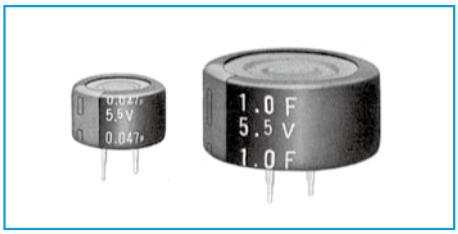
5.5V Wide Temperature Range Capacitors

GREEN CAP | 85°C

- It is a category temperature range larger than battery.
- φ13.5 size can encase up to 0.22F, φ21.5 size can encase up to 1.0F.
- It excels in rapid charge.
- Ideal for backing up of CMOS IC's, microcomputers, RAM's, RTC's for smart meter, outdoor equipment, auto motive and industrial.

Wide temperature range

DHL ⇦ DH



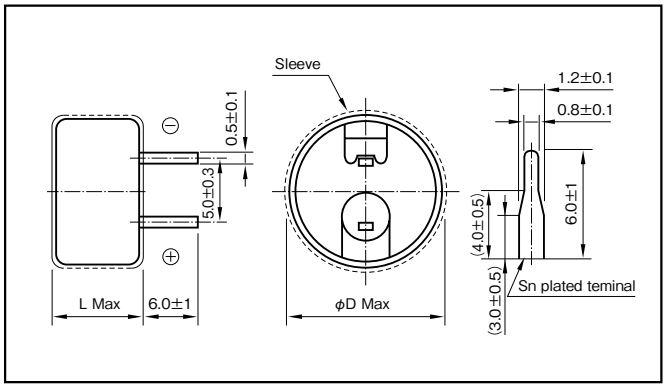
Marking color : White print on an indigo sleeve

Specifications

Item	Performance						
Category temperature range (℃)	−40 to +85						
Tolerance at rated capacitance (%)	−20 to +80						
Internal resistance at 1 kHz	Rated capacitance (F)	0.047	0.1	0.22	0.47	0.68	1
	Internal resistance (Ω Max.)	40	40	40	20	20	20
Characteristics at high and low temperature	Percentage of capacitance change	Within ±30% of the value at 20℃					
	Internal resistance	−40℃ : Less than seven times of the value at 20℃ 85℃ : Less than five times of the value at 20℃					
Endurance (85℃)	Test time	1000 hours					
	Percentage of capacitance change	Within ±30% of the initial measured value					
	Internal resistance	Less than four times of the initial specified value					
Shelf life (85℃)	Test time : 1000 hours ; Same as endurance.						
Applicable standards	Conforms to JIS C5160-1 2009 (IEC 62391-1 2006)						

Outline Drawing

Unit : mm



Part numbering system (example : 5.5V0.1F)

DHL	—	5R5	D	104	T
Series code		Rated voltage symbol	Terminal code	Rated capacitance symbol	

Part number is refer to following table.

Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	ELNA Parts No.	φD×L (mm)
5.5	0.047	DHL-5R5D473T	13.5×9.5
5.5	0.1	DHL-5R5D104T	13.5×9.5
5.5	0.22	DHL-5R5D224T	13.5×9.5
5.5	0.47	DHL-5R5D474T	21.5×9.5
5.5	0.68	DHL-5R5D684T	21.5×9.5
5.5	1	DHL-5R5D105T	21.5×9.5

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

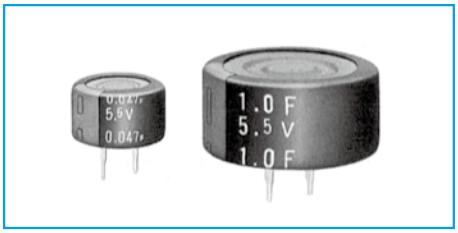
5.5V High Temperature, Long Life Capacitors

GREEN CAP | 85°C

- Guarantees 3000 hours at 85℃, 5.5V (10 years at room temperature).
- It is a category temperature range larger than battery.
- It excels in rapid charge.
- Ideal for backing up of CMOS IC's, microcomputers, RAM's, RTC's for smart meter, outdoor equipment, auto motive and industrial.

Long Life

DHC ⇦ DH



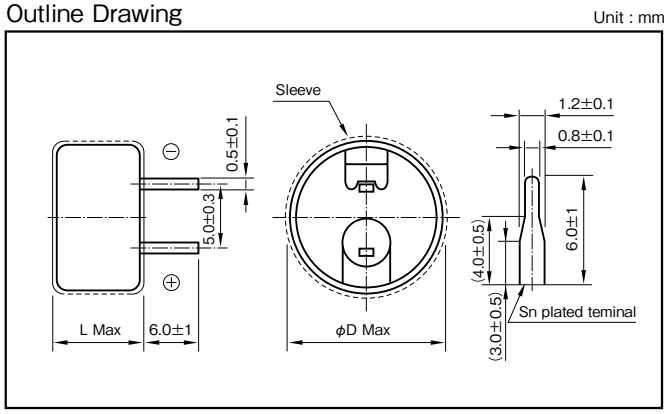
Marking color : White print on a Black sleeve

Specifications

Item	Performance
Category temperature range (℃)	−25 to +85
Tolerance at rated capacitance (%)	−20 to +80
Internal resistance at 1 kHz	Rated capacitance (F): 0.047 / 0.1 / 0.22 / 0.47 / 0.68 / 1 Internal resistance (Ω Max.): 300 / 200 / 120 / 50 / 50 / 30
Characteristics at high and low temperature	Percentage of capacitance change: Within ±30% of the value at 20℃ Internal resistance: less than five times of the value at 20℃
Endurance (85℃)	Test time: 3000 hours Percentage of capacitance change: Within ±30% of the initial measured value Internal resistance: Less than four times of the initial specified value
Shelf life (85℃)	Test time : 1000 hours ; Same as endurance.
Applicable standards	Conforms to JIS C5160-1 2009 (IEC 62391-1 2006)

Outline Drawing

Unit : mm



Part numbering system (example : 5.5V0.1F)

DHC	—	5R5	D	104	T
Series code		Rated voltage symbol	Terminal code	Rated capacitance symbol	

Part number is refer to following table.

Standard Ratings

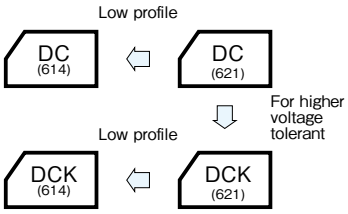
Max. operating voltage (V)	Rated capacitance (F)	ELNA Parts No.	ϕD×L (mm)
5.5	0.047	DHC-5R5D473T	13.5×9.5
5.5	0.1	DHC-5R5D104T	13.5×9.5
5.5	0.22	DHC-5R5D224T	13.5×9.5
5.5	0.47	DHC-5R5D474T	21.5×9.5
5.5	0.68	DHC-5R5D684T	21.5×9.5
5.5	1	DHC-5R5D105T	21.5×9.5

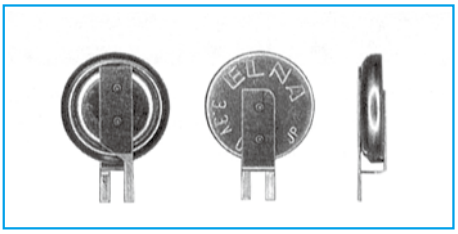
DC,DCK-614,621

Coin Cell Capacitors

GREEN CAP | 60℃/70℃

- Unlike batteries, the number of charging / discharging cycles unlimited and rapid charging / discharging is possible.
- High reliability, Safe and unlike secondary batteries, this is pollution free devices.
- 1.8mm height 614type made lineup in the DC, DCK Series.



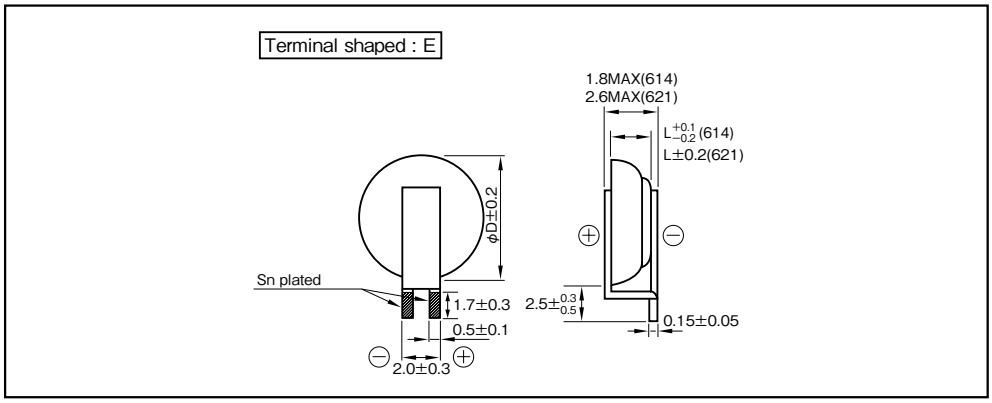


Specifications

Item	Performance	
Series Name	Series DC	Series DCK
Max. operating voltage (V)	2.5	3.3
Category temperature range (℃)	−25 to +70	−10 to +60
Tolerance at rated capacitance (%)	−20 to +80	−20 to +80
Internal resistance (Ω) at 1 kHz	Size code 614: Rated capacitance (F) 0.2; Internal resistance (ΩMax.) 100 Size code 621: Rated capacitance (F) 0.4; Internal resistance (ΩMax.) 100	Size code 614: Rated capacitance (F) 0.2; Internal resistance (ΩMax.) 200 Size code 621: Rated capacitance (F) 0.4; Internal resistance (ΩMax.) 200
Characteristics at high and low temperature	Size code 614: Percentage of capacitance change Within ±30% of the value at 20℃; Internal resistance Less than five times of the value at 20℃ Size code 621: Percentage of capacitance change Within ±30% of the value at 20℃; Internal resistance Less than five times of the value at 20℃	Size code 614: Percentage of capacitance change Within ±50% of the value at 20℃; Internal resistance Less than five times the initial specified value Size code 621: Percentage of capacitance change Within ±50% of the value at 20℃; Internal resistance Less than five times of the value at 20℃
Endurance	Size code 614: Test time and temp 70℃ 1000 hours; Percentage of capacitance change Within ±30% of the initial measured value; Internal resistance 1kΩ Max. Size code 621: Test time and temp 70℃ 500 hours; Percentage of capacitance change Within ±40% of the initial measured value; Internal resistance 400Ω Max.	Size code 614: Test time and temp 60℃ 1000 hours; Percentage of capacitance change Within ±30% of the initial measured value; Internal resistance 2kΩ Max. Size code 621: Test time and temp 60℃ 500 hours; Percentage of capacitance change Within ±40% of the initial measured value; Internal resistance 800Ω Max.
Shelf life	Same as endurance.	Same as endurance.
Applicable standards	Conforms to JIS C5160-1 2009 (IEC 62391-1 2006)	

Outline Drawing

Unit : mm



Part numbering system (example : 614,2.5V0.2F, terminal shaped : E)

DC	—	2R5	E	204	T	614	—	E
Series code		Max. operating voltage symbol		Rated capacitance symbol		Additional symbol		

Part number is refer to following table.

Part numbering system (example : 621, 3.3V0.4F, terminal shaped : E)

DCK	—	3R3	E	404	T	—	E
Series code		Max. operating voltage symbol		Rated capacitance symbol	Additional symbol		

Part number is refer to following table.

Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	ELNA Parts No.	φD×L (mm)
2.5	0.2	DC-2R5E204T614-E	6.8×1.4
3.3	0.2	DCK-3R3E204T614-E	6.8×1.4
2.5	0.4	DC-2R5E404T-E	6.8×2.1
3.3	0.4	DCK-3R3E404T-E	6.8×2.1

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

DSK-414 ELECTRIC DOUBLE LAYER CAPACITORS "DYNACAP"

ELNA®

Coin Cell Capacitors

GREEN CAP | 70℃

- Reflow soldering method available.
- Unlike batteries, the number of charging / discharging cycles unlimited and rapid charging / discharging is possible.
- Unlike batteries, exceilent charge and discharge characteristics with no chemical reactions.
- φ4.8×1.71Lmm Max height type made lineup in the DSK series.

Low profile

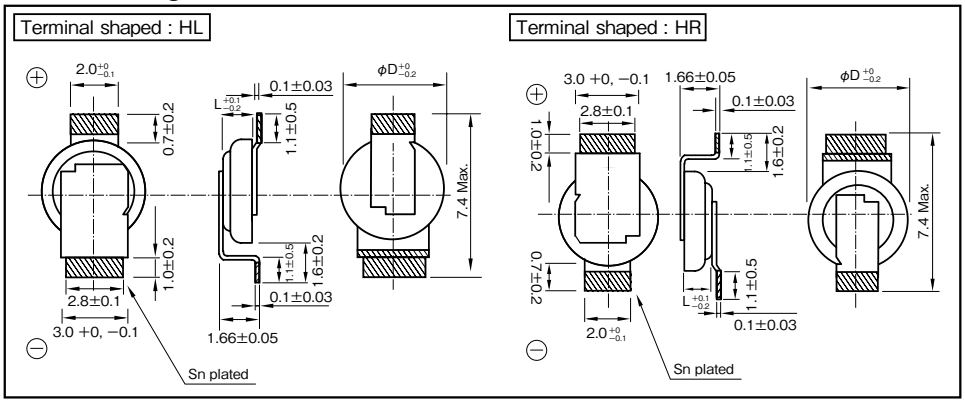
DSK (414) ⇦ DSK (614)

Specifications

Item	Performance
Series name	series DSK
Max. operating voltage (V)	3.3
Category temperature range (℃)	−10 to +70
Tolerance at rated capacitance (%)	−20 to +80
Rated capacitance (F)	0.07
Internal resistance (Ω Max.) at 1 kHz	100
Characteristics at high and low temperature	Percentage of capacitance change: Within ±50% of the value at 20℃ Internal resistance: Less than ten times of the initial specified value.
Endurance (70℃)	Test time: 500 hours Percentage of capacitance change: Within ±30% of the initial measured value Internal resistance: 5kΩ or less
Shelf life (70℃)	Test time : 500 hours ; Same as endurance.
Applicable standards	Conforms to JIS C5160-1 2009 (IEC 62391-1 2006)

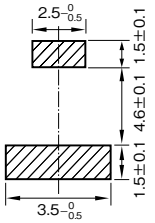
Outline Drawing

Unit : mm



Recommended land pattern size

Unit : mm



Polarity changesto terminal form.

*Please consult with us about other terminal form

Part numbering system (3.3V0.07F, terminal shaped : HL)

DSK	—	3R3	H	703	T414	—	HL	L
Series code		Max.operating voltage symbol		Rated capacitance symbol	Additional symbol		Terminal shaped	Taping symbol

Part number is refer to following table.

Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	ELNA Parts No.	φD×L (mm)
3.3	0.07	DSK-3R3H703T414-HLL	4.8×1.4
		DSK-3R3H703T414-HRL	

*Soldering conditions are described on page 191.

EDLC

ELNA®

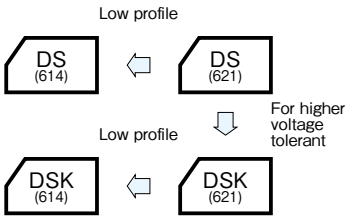
ELECTRIC DOUBLE LAYER CAPACITORS "DYNACAP"

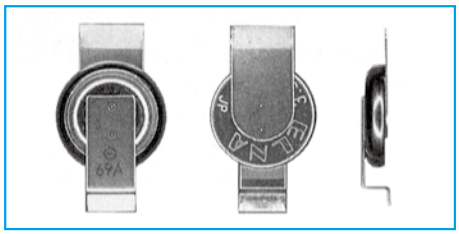
DS,DSK-614,621

Coin Cell Capacitors

GREEN CAP | 60°C / 70°C

- Reflow soldering method available.
- Unlike batteries, the number of charging/ discharging cycles unlimited and rapid charging/ discharging is possible.
- Unlike batteries, excellent charge and discharge characteristics with no chemical reactions.
- 1.8mm height type 614 made lineup in the DS, DSK series.



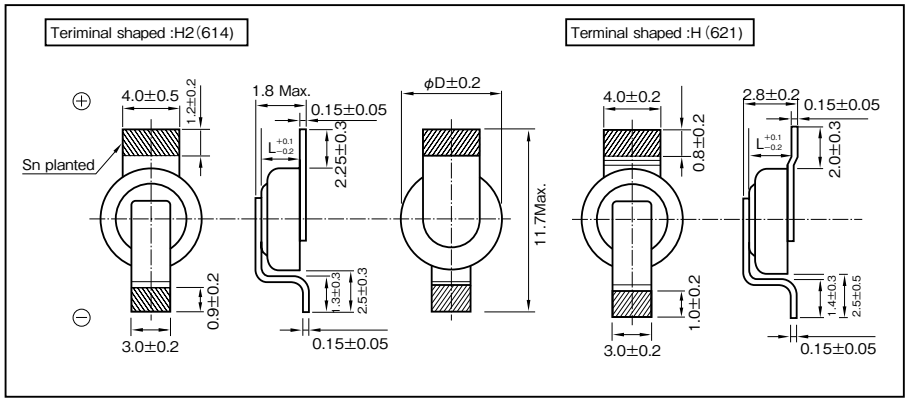


Specifications

Item	Performance	
Series Name	Series DS	Series DSK
Max.operating voltage (V)	2.5	3.3
Category temperature range (℃)	−25 to +70	−10 to +60
Tolerance at rated capacitance (%)	−20 to +80	−20 to +80
Internal resistance (Ω) at 1 kHz	Size code: 614 / 621 Rated capacitance (F): 0.2 / 0.33 Internal resistance (Ω Max.): 100 / 100	Size code: 614 / 621 Rated capacitance (F): 0.2 / 0.33 Internal resistance (Ω Max.): 200 / 200
Characteristics at high and low temperature	Size code: 614 / 621 Percentage of capacitance change: Within ±30% of the value at 20℃ / Within ±30% of the value at 20℃ Internal resistance: Less than five times of the value at 20℃ / Less than five times of the value at 20℃	Size code: 614 / 621 Percentage of capacitance change: Within ±50% of the value at 20℃ / Within ±50% of the value at 20℃ Internal resistance: Less than five times of the initial specified value / Less than five times of the value at 20℃
Endurance	Size code: 614 / 621 Test time and temp.: 70℃ 1000 hours / 70℃ 500 hours Percentage of capacitance change: Within ±30% of the initial measured value / Within ±30% of the initial measured value Internal resistance: 1kΩ Max. / 400Ω Max.	Size code: 614 / 621 Test time and temp.: 60℃ 1000 hours / 60℃ 500 hours Percentage of capacitance change: Within ±30% of the initial measured value / Within ±30% of the initial measured value Internal resistance: 2kΩ Max. / 800Ω Max.
Shelf life	Same as endurance.	Same as endurance.
Applicable standards	Conforms to JIS C5160-1 2009(IEC 62391-1 2006)	

Outline Drawing

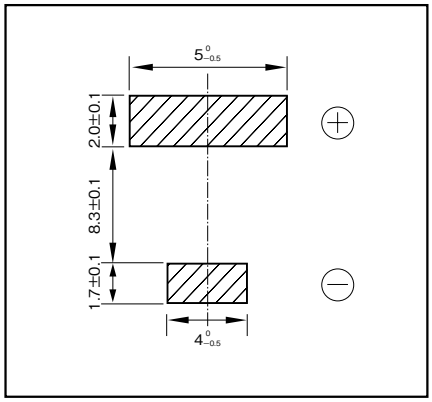
Unit : mm



※Please consult with us about other terminal form.

Recommended land pattern size

Unit : mm



Part numbering system (example : 614, 2.5V0.2F, terminal shaped : H2)

DS	—	2R5	H	204	T614	—	H2	L
Series code		Max.operating voltage symbol		Rated capacitance symbol	Additional symbol		Terminal shaped	Taping symbol

Part number is refer to following table.

Part numbering system (example:621, 3.3V0.33F, terminal shaped:H)

DSK	—	3R3	H	334	T	—	H	L
Series code		Max.operating voltage symbol		ated capacitance symbol	Additional symbol		Terminal shaped	Taping symbol

Part number is refer to following table.

Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	ELNA Parts No.	φD×L (mm)
2.5	0.2	DS-2R5H204T614-H2L	6.8×1.4
3.3	0.2	DSK-3R3H204T614-H2L	6.8×1.4
2.5	0.33	DS-2R5H334T-HL	6.8×2.1
3.3	0.33	DSK-3R3H334T-HL	6.8×2.1

＊Soldering conditions are described on page 191.

DZ,DZH ELECTRIC DOUBLE LAYER CAPACITORS "DYNACAP"

ELNA®

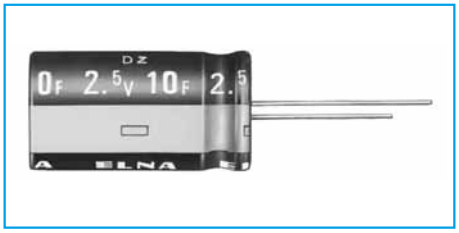
Standard, Large Capacitance Type Capacitors

GREEN CAP | 60°C / 70°C | 2.5V / 2.7V

- Pollution-Free ; with no pollutants such as Cd or Pb.
- Unlike batteries ; excellent charge and discharge characteristics with no chemical reactions

Large capacitance

DZH ⇦ DZ



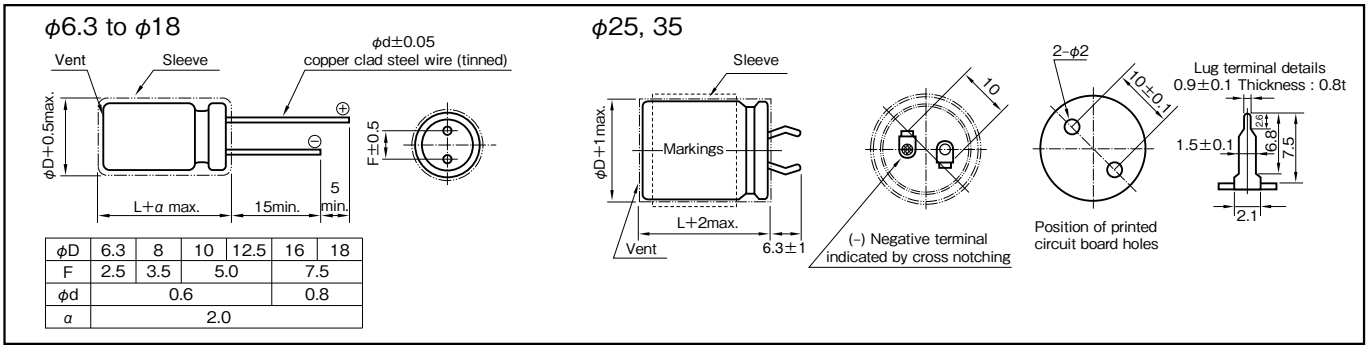
Marking color : White print on a black sleeve

Specifications

Item	Performance	
Series name	Series DZ	Series DZH
Category temperature range (℃)	−25 to +70	−25 to +60
Tolerance at rated capacitance (%)	−20 to +80	−20 to +80
Internal resistance at 1kHz	Refer to the following page	
Characteristics at high and low temperature	Percentage of capacitance change: Within ±30% of the value at 20℃ Internal resistance: Less than five times of the value at 20℃	Percentage of capacitance change: Within ±30% of the value at 20℃ Internal resistance: Less than eight times of the value at 20℃
Endurance	Test temperature: 70℃ Test time: 1000 hours Percentage of capacitance change: Within ±30% of the initial measured value Internal resistance: Less than four times of the initial specified value	Test temperature: 60℃ Test time: 2000 hours Percentage of capacitance change: Within ±30% of the initial measured value Internal resistance: Less than four times of the initial specified value
Shelf life	Same as endurance	Same as endurance
Applicable standards	Conforms to JIS C5160-1 2009 (IEC 62391-1 2006)	

Outline Drawing

Unit : mm



φD	6.3	8	10	12.5	16	18
F	2.5	3.5	5.0		7.5	
φd	0.6				0.8	
α	2.0					

Part numbering system (example : 2.5V10F)

DZ	—	2R5	D	106	(Z6)(S)	T	—	□
Series code		Max. operating voltage symbol	Terminal code	Rated capacitance symbol	Casing symbol			Taping (Forming) symbol

Part number is refer to the following page.

Standard Ratings (Series DZ 2.5V)

Max. operating voltage (V)	Rated capacitance (F)	Max. Leakage Current (mA) after 24h	ELNA Parts No.	φD×L (mm)	Internal resistance (Ω max.) at 1kHz	Internal resistance (mΩ) at 1kHz (measurement value)
2.5	1	0.1	DZ-2R5D105F4T	6.3×14	1.0	400
2.5	1	0.1	DZ-2R5D105G3T	8×12	1.0	200
2.5	2.7	0.2	DZ-2R5D275G5ST	8×20	0.5	150
2.5	3.3	0.2	DZ-2R5D335H5T	10×20	0.3	70
2.5	4.7	0.3	DZ-2R5D475H5T	10×20	0.2	80
2.5	5.6	0.3	DZ-2R5D565H5T	10×20	0.2	70
2.5	6.8	0.4	DZ-2R5D685H6T	10×25	0.2	60
2.5	10	0.5	DZ-2R5D106H8T	10×35	0.2	40
2.5	10	0.5	DZ-2R5D106Z6ST	12.5×25	0.2	40
2.5	15	0.7	DZ-2R5D156Z8ST	12.5×35	0.2	35
2.5	15	0.7	DZ-2R5D156J5T	16×20	0.2	35
2.5	22	0.8	DZ-2R5D226J6T	16×25	0.2	30
2.5	33	0.8	DZ-2R5D336J8T	16×35.5	0.2	30
2.5	40	0.8	DZ-2R5D406K9T	18×40	0.2	30
2.5	50	1.0	DZ-2R5D506T	25×40	0.08	20
2.5	100	1.0	DZ-2R5D107S37T	25×50	0.08	15
2.5	200	2.0	DZ-2R5D207S57T	35×50	0.08	15

We tailor packaged product in series and parallel arrangements according to voltage and capacitance as required.

Standard Ratings (Series DZ 2.7V)

Max. operating voltage (V)	Rated capacitance (F)	Max. Leakage Current (mA) after 24h	ELNA Parts No.	φD×L (mm)	Internal resistance (Ω max.) at 1kHz	Internal resistance (mΩ) at 1kHz (measurement value)
2.7	1	0.2	DZ-2R7D105F4T	6.3×14	1.0	400
2.7	1	0.2	DZ-2R7D105G3T	8×12	1.0	200
2.7	2.7	0.3	DZ-2R7D275G5ST	8×20	0.5	150
2.7	3.3	0.3	DZ-2R7D335H5T	10×20	0.3	70
2.7	4.7	0.4	DZ-2R7D475H5T	10×20	0.2	80
2.7	5.6	0.4	DZ-2R7D565H5T	10×20	0.2	70
2.7	6.8	0.5	DZ-2R7D685H6T	10×25	0.2	60
2.7	10	0.6	DZ-2R7D106H8T	10×35	0.2	40
2.7	10	0.6	DZ-2R7D106Z6ST	12.5×25	0.2	40
2.7	15	0.8	DZ-2R7D156Z8ST	12.5×35	0.2	35
2.7	15	0.8	DZ-2R7D156J6T	16×25	0.2	35
2.7	22	1.0	DZ-2R7D226J7T	16×31.5	0.2	30
2.7	33	1.0	DZ-2R7D336J9T	16×40	0.2	30

We tailor packaged product in series and parallel arrangements according to voltage and capacitance as required.

Standard Ratings (Series DZH 2.5V)

Max. operating voltage (V)	Rated capacitance (F)	Max. Leakage Current (mA) after 24h	ELNA Parts No.	φD×L (mm)	Internal resistance (Ω max.) at 1kHz	Internal resistance (mΩ) at 1kHz (measurement value)
2.5	22	0.8	DZH-2R5D226Z8ST	12.5×35	0.2	55
2.5	50	1.0	DZH-2R5D506K9T	18×40	0.08	30
2.5	100	2.0	DZH-2R5D107S35T	25×40	0.08	20
2.5	300	5.0	DZH-2R5D307S57T	35×50	0.08	15

We tailor packaged product in series and parallel arrangements according to voltage and capacitance as required.

DZN ELECTRIC DOUBLE LAYER CAPACITORS "DYNACAP"

ELNA®

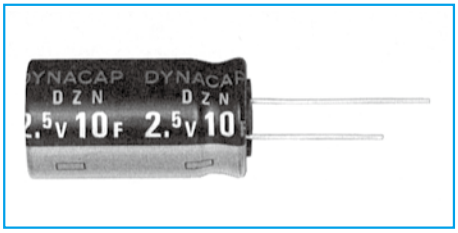
High Power Type Capacitors

GREEN CAP | 70°C | Low ESR | 2.5V / 2.7V

- Low internal resistance allows boosting charge and heavy-current discharge. (ampere level)
- Pollution-Free ; with no pollutants such as Cd or Pb.
- Unlike batteries, excellent charge and discharge characteristics with no chemical reaction

High power

DZN ⇦ DZ



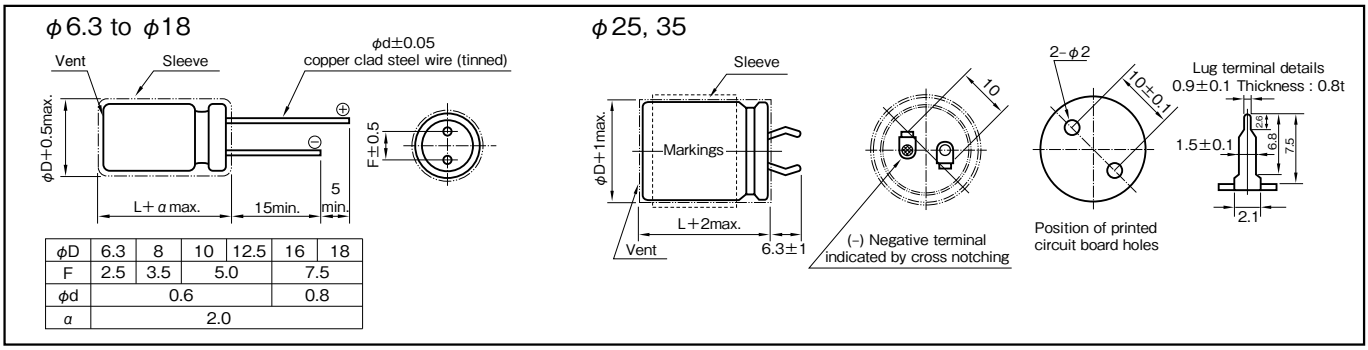
Marking color : White print on a blue sleeve

Specifications

Item	Performance
Category temperature range (℃)	−25 to +70
Tolerance at rated capacitance (%)	−20 to +80
Internal resistance at 1 kHz	Refer to the following page
Characteristics at high and low temperature	Percentage of capacitance change: Within ±30% of the value at 20℃ Internal resistance: Less than five times of the value at 20℃
Endurance (70℃)	Test time: 1000 hours Percentage of capacitance change: Within ±30% of the initial measured value Internal resistance: Less than four times of the initial specified value
Shelf life (70℃)	Test time : 1000 hours ; Same as endurance.
Applicable standards	Conforms to JIS C5160-1 2009 (IEC 62391-1 2006)

Outline Drawing

Unit : mm



φD	6.3	8	10	12.5	16	18
F	2.5	3.5	5.0		7.5	
φd	0.6				0.8	
α	2.0					

Part numbering system (example : 2.5V10F)

DZN	—	2R5	D	106	(Z6)(S)	T	—	□
Series code		Max. operating voltage symbol	Terminal code	Rated capacitance symbol	Casing symbol			Taping (Forming) symbol

Part number is refer to the following page.

Standard Ratings (Series DZN 2.5V)

Max. operating voltage (V)	Rated capacitance (F)	Max. Leakage Current (mA) after 24h	ELNA Parts No.	φD×L (mm)	Internal resistance (Ω max.) at 1kHz	Internal resistance (mΩ max.) (DCR)
2.5	1	0.1	DZN-2R5D105F4T	6.3×14	0.4	1500
2.5	1	0.1	DZN-2R5D105G3T	8×12	0.3	1000
2.5	2.7	0.2	DZN-2R5D275G5ST	8×20	0.3	500
2.5	3.3	0.2	DZN-2R5D335H5T	10×20	0.2	350
2.5	4.7	0.3	DZN-2R5D475H5T	10×20	0.1	400
2.5	5.6	0.3	DZN-2R5D565H5T	10×20	0.1	350
2.5	6.8	0.4	DZN-2R5D685H6T	10×25	0.1	300
2.5	10	0.5	DZN-2R5D106H8T	10×35	0.1	200
2.5	10	0.5	DZN-2R5D106Z6ST	12.5×25	0.1	200
2.5	15	0.7	DZN-2R5D156Z8ST	12.5×35	0.1	150
2.5	15	0.7	DZN-2R5D156J5T	16×20	0.1	150
2.5	22	0.8	DZN-2R5D226J6T	16×25	0.1	120
2.5	33	0.8	DZN-2R5D336J8T	16×35.5	0.1	100
2.5	40	0.8	DZN-2R5D406K9T	18×40	0.1	75
2.5	50	1.0	DZN-2R5D506T	25×40	0.03	60
2.5	100	1.0	DZN-2R5D107S37T	25×50	0.03	50
2.5	200	2.0	DZN-2R5D207S57T	35×50	0.03	40

We tailor packaged product in series and parallel arrangements according to voltage and capacitance as required.

Standard Ratings (Series DZN 2.7V)

Max. operating voltage (V)	Rated capacitance (F)	Max. Leakage Current (mA) after 24h	ELNA Parts No.	φD×L (mm)	Internal resistance (Ω max.) at 1kHz	Internal resistance (mΩ max.) (DCR)
2.7	1	0.2	DZN-2R7D105F4T	6.3×14	0.4	1500
2.7	1	0.2	DZN-2R7D105G3T	8×12	0.3	1000
2.7	2.7	0.3	DZN-2R7D275G5ST	8×20	0.3	500
2.7	3.3	0.3	DZN-2R7D335H5T	10×20	0.2	350
2.7	4.7	0.4	DZN-2R7D475H5T	10×20	0.1	400
2.7	5.6	0.4	DZN-2R7D565H5T	10×20	0.1	350
2.7	6.8	0.5	DZN-2R7D685H6T	10×25	0.1	300
2.7	10	0.6	DZN-2R7D106H8T	10×35	0.1	200
2.7	10	0.6	DZN-2R7D106Z6ST	12.5×25	0.1	200
2.7	15	0.8	DZN-2R7D156Z8ST	12.5×35	0.1	150
2.7	15	0.8	DZN-2R7D156J6T	16×25	0.1	150
2.7	22	1.0	DZN-2R7D226J7T	16×31.5	0.1	120
2.7	33	1.0	DZN-2R7D336J9T	16×40	0.1	100

We tailor packaged product in series and parallel arrangements according to voltage and capacitance as required.

DU ELECTRIC DOUBLE LAYER CAPACITORS "DYNACAP"

ELNA®

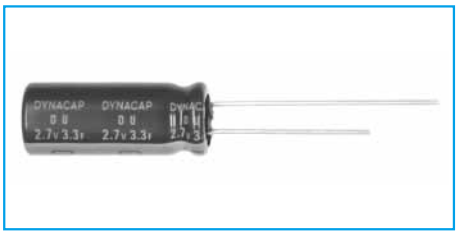
High Power, For Low Temperature Type Capacitors

GREEN CAP | 65°C | 2.7V | For −40°C

- For Low Temperature (−40°C).
- Pollution-Free ; with no pollutants such as Cd or Pb.
- Unlike batteries, excellent charge and discharge characteristics with no chemical reaction.

For low temperature

DU ⇦ DZN



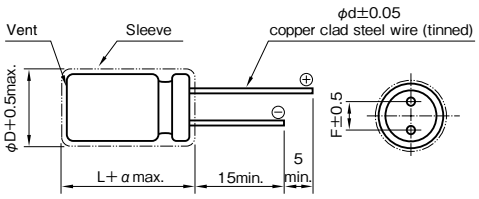
Marking color : White print on a brown sleeve

Specifications

Item	Performance	
Category temperature range (℃)	−40 to +65	
Tolerance at rated capacitance (%)	−20 to +80	
Internal resistance at 1 kHz	Refer to the Standard Ratings	
Characteristics at high and low temperature	Percentage of capacitance change	Within ±30% of the value at 20℃
	Internal resistance	Less than three times of the value at 20℃
Endurance (65℃)	Test time	1000 hours
	Percentage of capacitance change	Within ±30% of initial measured value
	Internal resistance	Less than three times of the initial specified value
Shelf life (65℃)	Test time : 1000 hours ; same as endurance.	
Applicable standards	Conforms to JIS C5160-1 2009 (IEC 62391-1 2006)	

Outline Drawing

Unit : mm



φD	8	10	12.5	16
F	3.5	5.0		7.5
φd	0.6			0.8
α	2.0			

Part numbering system (example : 2.7V10F)

DU	—	2R7	D	106	H7	T	—	□
Series code		Max. operating voltage symbol	Terminal code	Rated capacitance symbol	Casing symbol			Taping (Forming) symbol

Part number is refer to the following table.

Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	Max. Leakage Current (mA) after 24h	ELNA Parts No.	φD×L (mm)	Internal resistance (mΩ max.) at 1kHz	Internal resistance (mΩ max.) (DCR)
2.7	1	0.2	DU-2R7D105G3T	8×12	250	700
2.7	3.3	0.3	DU-2R7D335G5T	8×20	75	200
2.7	6.8	0.5	DU-2R7D685H5T	10×20	60	120
2.7	10	0.6	DU-2R7D106H7T	10×30	50	75
2.7	15	0.8	DU-2R7D156Z6T	12.5×25	35	60
2.7	25	1.0	DU-2R7D256J6T	16×25	25	42
2.7	33	1.0	DU-2R7D336J7T	16×31.5	20	35

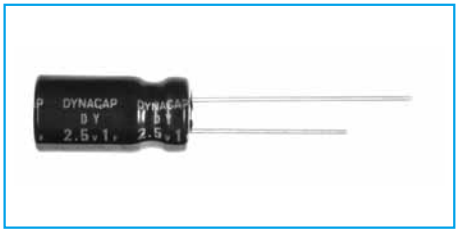
For Low Temperature Type Capacitors

GREEN CAP | 70°C | 2.5V | For −40°C

- For Low Temperature (−40°C).
- Pollution-Free ; with no pollutants such as Cd or Pb.
- Unlike batteries, excellent charge and discharge characteristics with no chemical reaction.

For low temperature

DY ⇦ DZ



Marking color : White print on a brown sleeve

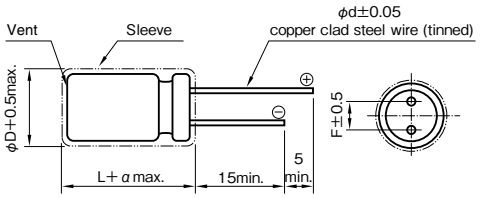
Specifications

Item	Performance		
Category temperature range (℃)	−40 to +70		
Tolerance at rated capacitance (%)	−20 to +80		
Internal resistance at 1 kHz	Refer to the Standard Ratings		
Characteristics at high and low temperature	Percentage of capacitance change	−20 to +70℃	Within ±30% of the value at 20℃
		−40 to <− 25℃	Within ±50% of the value at 20℃
	Internal resistance	−20 to +70℃	Less than five times of the value at 20℃
		−40 to <− 25℃	Less than ten times of the value at 20℃
Endurance (70℃)	Test time	1000 hours	
	Percentage of capacitance change	Within ±30% of initial measured value	
	Internal resistance	Less than four times of the initial specified value	
Shelf life (70℃)	Test time : 1000 hours ; Same as endurance.		
Applicable standards	Conforms to JIS C5160-1 2009 (IEC 62391-1 2006)		

Outline Drawing

Unit : mm

φ8 to φ18



φD	8	10	16	18
F	3.5	5.0	7.5	
φd	0.6		0.8	
α	2.0			

Part numbering system (example : 2.5V10F)

DY	—	2R5	D	106	(H8)(S)	T	—	☐
Series code		Max. operating voltage symbol	Terminal code	Rated capacitance symbol	Casing symbol			Taping (Forming) symbol

Part number is refer to the following table.

Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	Max. Leakage Current (mA) after 24h	ELNA Parts No.	φD×L (mm)	Internal resistance (Ω max.) at 1kHz	Internal resistance (mΩ) at 1kHz (measurement value)
2.5	1	0.1	DY-2R5D105G3T	8×12	1	200
2.5	2.7	0.2	DY-2R5D275G5ST	8×20	0.5	120
2.5	3.3	0.2	DY-2R5D335H5T	10×20	0.3	60
2.5	4.7	0.3	DY-2R5D475H5T	10×20	0.2	70
2.5	5.6	0.3	DY-2R5D565H5T	10×20	0.2	70
2.5	6.8	0.4	DY-2R5D685H6T	10×25	0.2	50
2.5	10	0.5	DY-2R5D106H8T	10×35	0.2	35
2.5	10	0.5	DY-2R5D106Z6ST	12.5×25	0.2	35
2.5	15	0.7	DY-2R5D156Z8ST	12.5×35	0.2	30
2.5	15	0.7	DY-2R5D156J5T	16×20	0.2	30
2.5	22	0.8	DY-2R5D226J6T	16×25	0.2	25
2.5	33	0.8	DY-2R5D336J8T	16×35.5	0.2	25
2.5	40	0.8	DY-2R5D406K9T	18×40	0.2	25

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

DZP ELECTRIC DOUBLE LAYER CAPACITORS "DYNACAP"

ELNA®

Packed Type Capacitors

GREEN CAP | 70°C | 5.0V

- High-voltage capacitor which connected DZ in series.
- Pollution-Free ; with no pollutants such as Cd or Pb.
- Unlike batteries, excellent charge and discharge characteristics with no chemical reaction.

High voltage

DZP ⇦ DZ

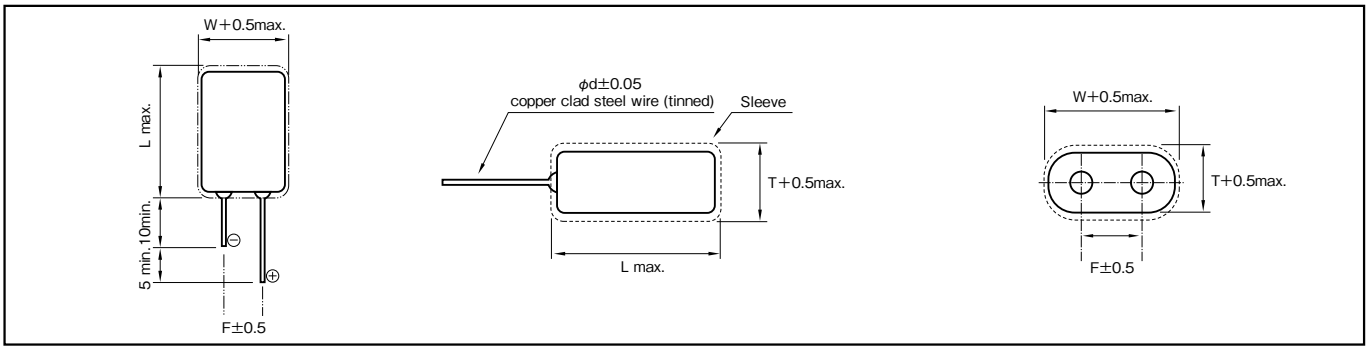
Marking color : White print on a blue sleeve

Specifications

Item	Performance
Category temperature range (℃)	−25 to +70
Tolerance at rated capacitance (%)	−20 to +80
Internal resistance at 1 kHz	Refer to the Standard Ratings
Characteristics at high and low temperature	Percentage of capacitance change: Within ±30% of the value at 20℃ Internal resistance: Less than five times of the value at 20℃
Endurance (70℃)	Test time: 1000 hours Percentage of capacitance change: Within ±30% of the initial measured value Internal resistance: Less than four times of the initial specified value
Shelf life (70℃)	Test time : 1000hours ; same as endurance.
Applicable standards	Conforms to JIS C5160-1 2009 (IEC 62391-1 2006)

Outline Drawing

Unit : mm



Part numbering system (example : 5.0V0.47F)						
DZP	—	5	V	474	G3( )	NT(S1)□
Series code		Max. operating voltage symbol		Rated capacitance symbol	Casing symbol	Additional code

Part number is refer to the following table.

Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	Max. Leakage Current (mA) after 24h	ELNA Parts No.	T×W×L (mm)	φd	F	Internal resistance (Ω max.) at 1kHz	Internal resistance (mΩ) at 1kHz (measurement value)
5.0	0.47	0.2	DZP-5V474G3NTS1A	8.5×17.0×16.0	0.6	5.1	0.6	300
			DZP-5V474G3NTS1B			12.1		
5.0	1.0	0.3	DZP-5V105G5SNTA	8.5×17.0×24.0	0.6	5.1	0.6	240
			DZP-5V105G5SNTB			12.1		
5.0	1.5	0.4	DZP-5V155G5SNTA	8.5×17.0×24.0	0.6	5.1	0.6	200
			DZP-5V155G5SNTB			12.1		
5.0	3.3	0.8	DZP-5V335H7NTS1A	10.5×21.0×34.0	0.6	5.5	0.2	80
			DZP-5V335H7NTS1B			15.5		
5.0	4.7	1.0	DZP-5V475H8NTS1A	10.5×21.0×39.0	0.6	5.5	0.2	70
			DZP-5V475H8NTS1B			15.5		

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Large Capacitance, High Power Type Capacitors

GREEN CAP | 65°C | 2.7V

- Because it is large capacitance and low resistance, most suitable for such as energy regeneration, and a large current discharge use.
- Pollution-Free ; with no pollutants such as Cd or Pb.
- Unlike batteries, excellent charge and discharge characteristics with no chemical reaction.

High power

DW ⇦ DP

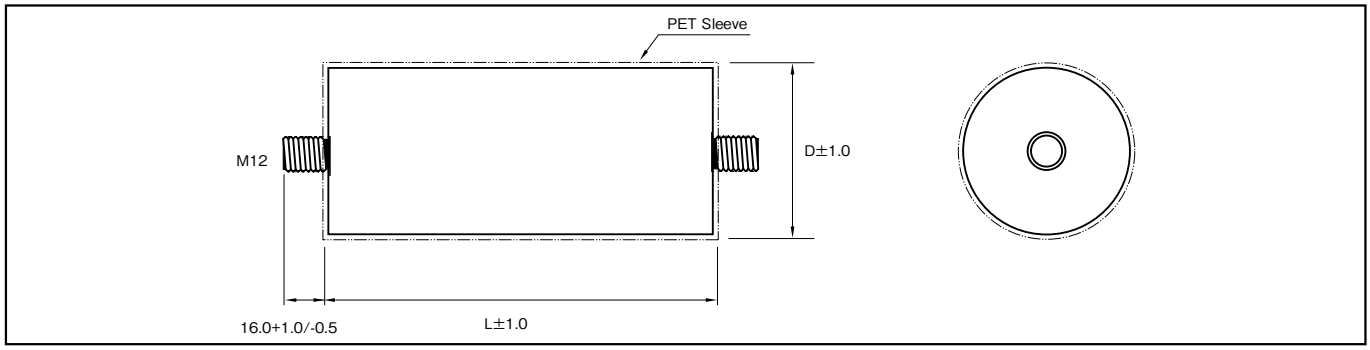
Marking color : White print on a black sleeve

Specifications

Item	Performance
Category temperature range (℃)	−40 to +65
Tolerance at rated capacitance (%)	0 to +30
Internal resistance (DCR)	Refer to the Standard Ratings
Characteristics at high and low temperature	Percentage of capacitance change: Within ±30% of the value at 20℃ Internal resistance (DCR): Less than three times of the value at 20℃
Endurance (65℃)	Test time: 1500 hours Percentage of capacitance change: Within ±20% of the initial measured value Internal resistance (DCR): Less than three times of the initial specified value
Shelf life (65℃)	Test time : 1500hours ; same as endurance.
Applicable standards	Conforms to JIS C5160-1 2009 (IEC 62391-1 2006)

Outline Drawing

Unit : mm



Part numbering system (example : 2.7V3000F)						
DW	—	2R7	D	308	DE0	T
Series code		Max. operating voltage symbol		Rated capacitance symbol	Casing symbol	

Part number is refer to the following table.

Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	ELNA Parts No.	φD×L (mm)	Internal resistance (mΩ max.) (DCR)
2.7	3000	DW-2R7D308DE0T	61×138	0.29

ELNA®

Large Capacitance, High Energy Type Capacitors

GREEN CAP | 60°C

- Most suitable for energy storage with large capacitance.
- Terminals arranged in the same orientation provide easy connection.
- Unlike batteries, safe and high reliability without containing active and hazardous substances.
- Unlike batteries, excellent charge and discharge characteristics with no chemical reactions.

Large capacitance

DP ⇦ DZ

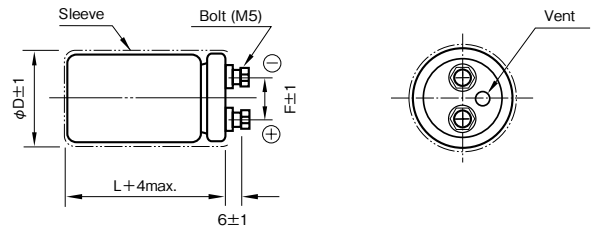
Marking color : White print on a black sleeve

Specifications

Item	Performance
Category temperature range (℃)	−25 to +60
Tolerance at rated capacitance (%)	−20 to +20
Internal resistance at 1 kHz	Rated capacitance (F): 500 / 600 / 1200 / 1500 Internal resistance (mΩ Max.): 12 / 10 / 10 / 10
Characteristics at high and low temperature	Percentage of capacitance change: Within ±30% of value at 20℃ Internal resistance: Less than five times of the value at 20℃
Endurance (60℃)	Test time: 2000 hours Percentage of capacitance change: Within ±30% of the initial measured value Internal resistance: Less than four times of the initial specified value
Shelf life (60℃)	Test time : 2000 hours ; Same as endurance.
Applicable standards	Conforms to JIS C5160-1 2009 (IEC 62391-1 2006)

Outline Drawing

Unit : mm



Capacitance (F)	φD	L	F
500	35	85	12.7
600	35	105	12.7
1200	51	105	21.8
1500	51	120	21.8

Part numbering system (example : 2.5V600F)

DP	—	2R5	D	607	AA5
Series code		Max.operating voltage symbol		Rated capacitance symbol	Casing symbol

Part number is refer to the following table.

Standard Ratings

Max. operating voltage (V)	Rated capacitance (F)	ELNA Parts No.	φD×L (mm)	＊Internal resistance (mΩ) at 1kHz (measurement value)
2.5	500	DP-2R5D507A85	35× 85	4.0
2.5	600	DP-2R5D607AA5	35×105	3.2
2.5	1200	DP-2R5D128CA5	51×105	3.0
2.5	1500	DP-2R5D158CC0	51×120	3.0

＊Internal resistance are not guaranteed values, but measurement value.
We tailor packaged product in series and parallel arrangements according to voltage and capacitance as required.

EDLC

1 Description of Electric Double Layer Capacitor

1-1 Basic Concepts

Generally capacitors are constructed with a dielectric placed between opposed electrodes, functioning as capacitors by accumulating charges in the dielectric material. Aluminum electrolytic and tantalum electrolytic capacitors, for example, use an aluminum oxide film and a tantalum oxide film as the dielectric, respectively.

On the other hand, Electric Double Layer Capacitors have no visible dielectric in a general sense but utilize the state referred to as the electric double layer, which is developed naturally on the interface between substances, as the function of dielectric.

1-2 Operating Principle

The Electric Double Layer represents the state in which positive and negative charges exist at a very short distance on the boundary where contact occurs between two different substances (e.g. solid and liquid). By externally applying a voltage below a certain voltage to the boundary, higher charges can be accumulated. Accordingly, charge and discharge of electric double layer capacitors utilize adsorption and desorption of ions to the ionic adsorption layer (Electric Double Layer) formed on the electrode surface of the activated carbon used for electrodes.

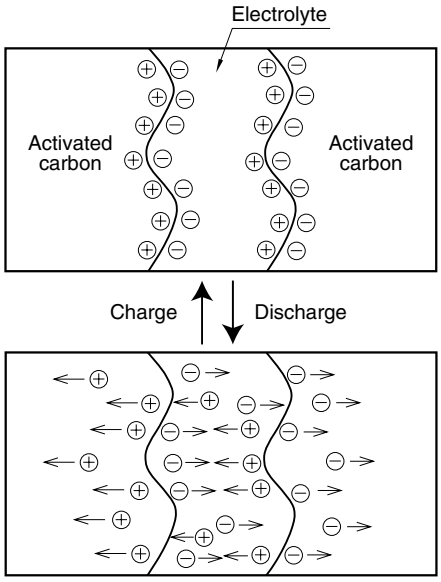


Fig.1 Schematic of Principle of Electric Double Layer Capacitor

Applying DC voltage externally across the electrodes of the Electric Double Layer allows almost no passage of current up to a certain voltage, exhibiting a condition like insulation.
However, the application of voltages exceeding the certain voltage causes electrolysis to occur in the electrolyte, resulting in abrupt passage of current.

This voltage determines the resistance of voltage of an Electric Double Layer Capacitor. We use an organic electrolyte and its standard electrolysis occurs at the voltage of about 2.5 to 3V.

1-3 Advantages and Disadvantages of Electric Double Layer Capacitor

[Advantages]

(1) Small size and capacitance in farads (F) available by utilizing the activated carbon electrode with a large surface area
(2) No special charging circuit and constrains during discharge are required.
(3) No effect on the life through overcharging and overdischarging
(4) Environmentally clean energy

[Disadvantage]

(1) The life is limited due to the use of electrolyte.
(2) Series connection is required when used with a low resistance of voltage at a high voltage.
(3) Cannot be used in AC circuits due to high internal resistance unlike aluminum electrolytic capacitors.

1-4 Construction of DYNACAP

The series which consists of coin cells is similar to that of coin-type batteries as shown in Fig.2. DYNACAP contains a single cell or two to three cells stacked in series.

Since these series have a large electrode-to-electrode distance and a small electrode area exhibiting a large internal resistance, they are suitable for the memory backup application that involves microcurrent discharge.

The cylindrical cell construction as seen in the DZ and DZN series has the construction similar to that of aluminum electrolytic capacitors as shown in Fig.3.

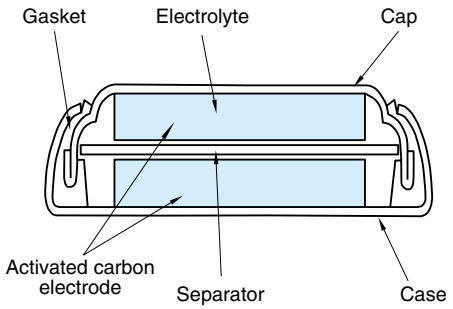


Fig.2 Example of Basic Construction of Coin Cell

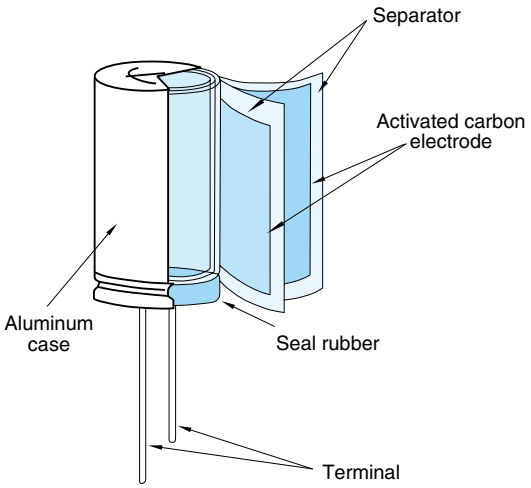


Fig.3 Example of Basic Construction of Cylindrical Cell

These series have a small electrode-to-electrode distance, allowing a large electrode area because of the winding structure. This decreases the internal resistance, which is primary suitable for applications requiring high-power such as motor drive and LED lighting that need high currents.

2 Description of Life Expectancy

Generally, the life of Electric Double Layer Capacitors is largely affected by the ambient temperature.
The expected life is approximated by the equation as shown below:

$$L = L_0 \times 2^{\left(\frac{T_0 - T}{10}\right)}$$

Where,

- L : Expected lifetime at temperature T
- L_0 : Lifetime at temperature T_0
- T : Expected working temperature
- T_0 : Upper category temperature

Note that the above equation does not cover charge and discharge. In the case of charge and discharge, heat generation occurs inside a capacitor; the temperature rise by this heat generation must also be considered.

3 Calculation Method of Discharge Time

3-1 Approximating the Discharge Time of Basic Constant Current Discharge

The discharge time at the constant current of a capacitor can be calculated by the following equation.

$t = (C \times \Delta V)/I$

Where,

t : Discharge time (sec.)
C : Capacitor capacitance (F)
ΔV : Working voltage range (V)
I : Discharge current (A)

As an example, we calculate the discharge time when a capacitor of the DB series 5.5V 1F is charged with 5V and discharged to 3V at a constant current of 1 mA. Since the working voltage range ΔV is 2V from 5 — 3V, t = (1F × 2V)/0.001A from the above equation, and the discharge time can be calculated as 2,000 seconds (about 33 minutes). Note that the actual discharge time may be different because this equation does not cover the effect of the self-discharge and the IR drop by internal resistance described below.

3-2 Effect of Self-discharge at Microcurrents

When backup is made by discharge with a micro-current below some μA especially for the memory backup application and the like, the discharge time must be determined while taking into account the self-discharge as shown in Fig.4.

The value closer to the actual discharge curve is obtained by adding the voltage drop through the self-discharge determined from the voltage retention characteristic test to the discharge curve given by calculation.

Note that the value of self-discharge varies by the charge time, charging current and an ambient temperature.

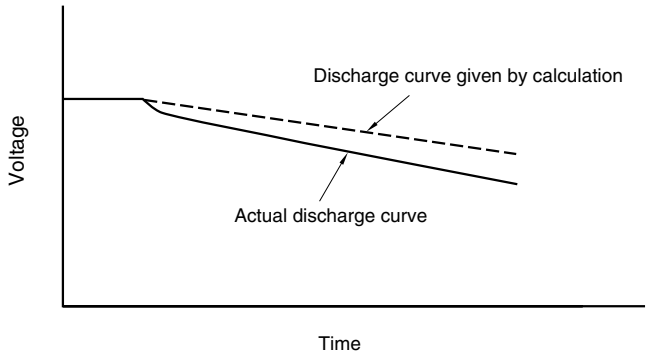


Fig.4 Example of Discharge Curve involving Self-Discharge

3-3 Effect of IR Drop at Large Currents

When a large Current discharge and a capacitor with a high internal resistance are used, the effect of IR drop by the product of the internal resistance and the current must be considered as shown in Fig.5.

When a large current is required in a very short time, or a large instantaneous current flows at the start of discharge, the voltage drop indicated with ΔV1 counts. However, when the discharge continues as it is, the discharge curve indicates in a manner showing a slow diffusion and then keeps a constant straight line.

We also make calculation including ΔV2 of the intersection extending from the initial discharge and the discharge straight line section including the diffusion curve when indicating the DC internal resistance.

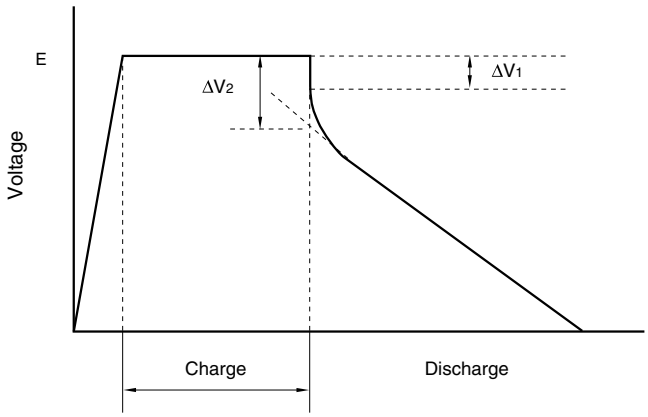


Fig.5 Example of Discharge Curve involving IR Drop

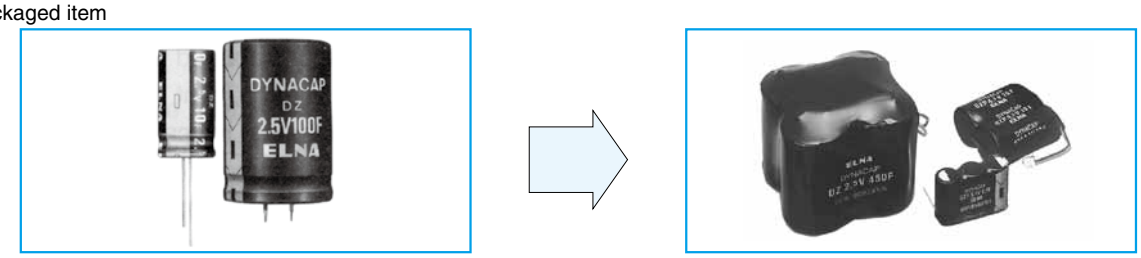
Due to IR drop, the shape of the discharge curve varies by the internal resistance and ambient temperature for each series.

4 Series-parallel connection packaged products.

Electric Double Layer Capacitors have a low operating voltage per cell.
To deal with this, ELNA is ready to offer series packaging for high operating voltages to meet to various needs.

Please consult with us on optimization and design.

Packaged item



Example of packaged item

In case of a low voltage (up to about 24 V) for the DZ and DZN series with relatively low capacitance, we are preparing simple packaged products.
No full-scale voltage equalization circuit has been equipped yet, but comparatively low cost and flexible layout can be realized.

5 Moisture-proof provision

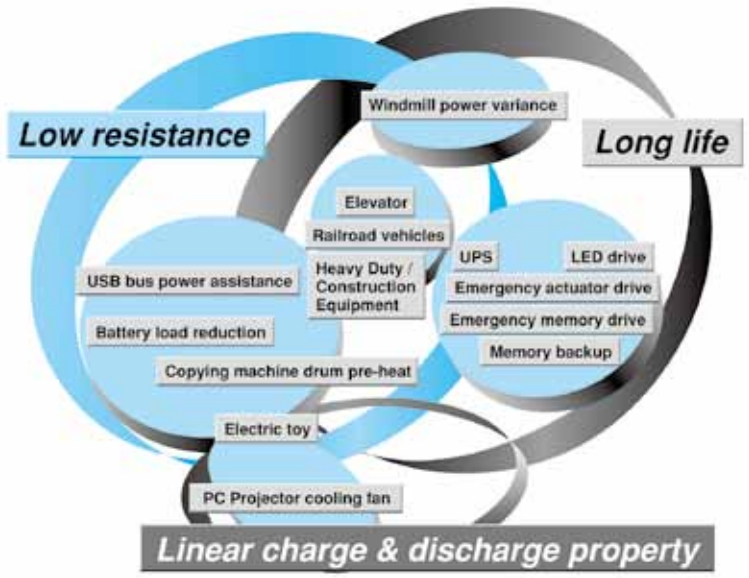
If a electric double layer capacitor is used in a heat-and-high-humidity environment, the characteristic will deteriorate.
We can improve the durability in heat-and-high-humidity environment by coating of special resin.
Please consult about resin coating.

6 Regarding Recovery Voltage

After charging and then discharging the electric double layer capacitor, and further causing short-circuit to the terminals and leave them alone, the voltage between the two terminals will rise again after some interval. This voltage is called recovery voltage.
This voltage may cause the bad influence to the low-voltage driven components (CPU, memory, etc.) or damage of the capacitor with soldering.
Discharging before use is safer. It is important especially when using it by series connection.
Moreover, it is possible making the terminals in short-circuit condition at the production stage. Please consult us for adequate procedures.

7 Applications

Features & Benefits of Electric Double Layer Capacitor



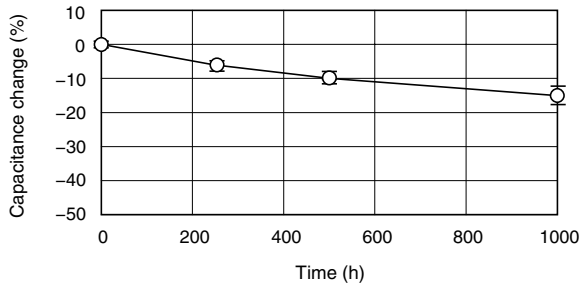
7 Electric Characteristics Data

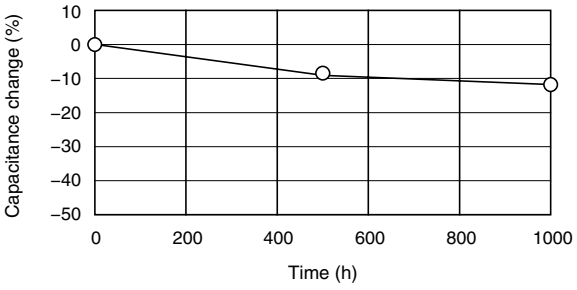
7-1 Coin type for memory back-up

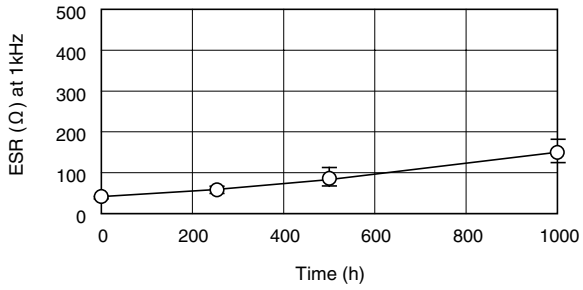
DYNACAP Series DXJ
5.5V 0.33F/DXJ-5R5H334 φ11.5×5L (mm)

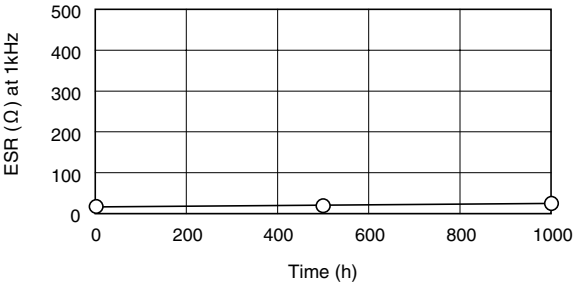
DYNACAP Series DHL
5.5V 0.22F/DHL-5R5D224T φ13.5×9.5L (mm)

■ Endurance (85℃ 5.5V.DC)

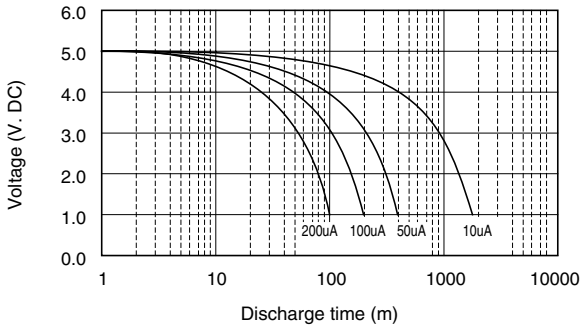


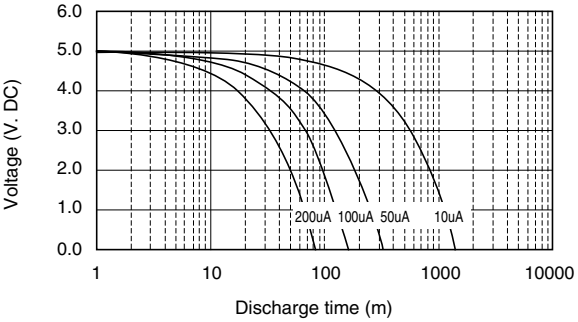




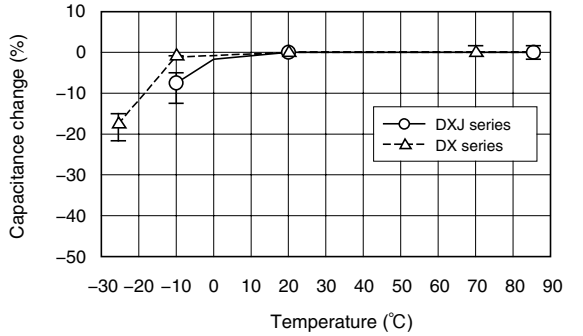


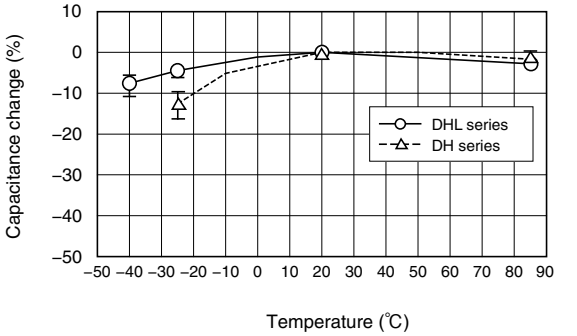
■ Discharge characteristics

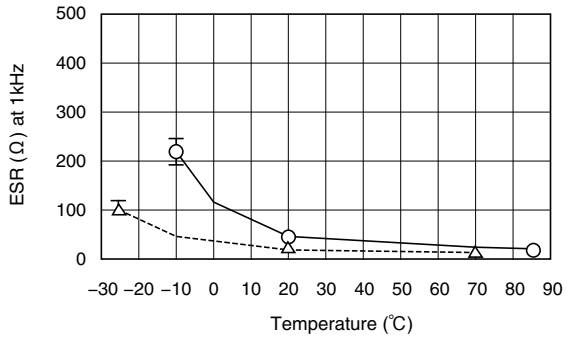


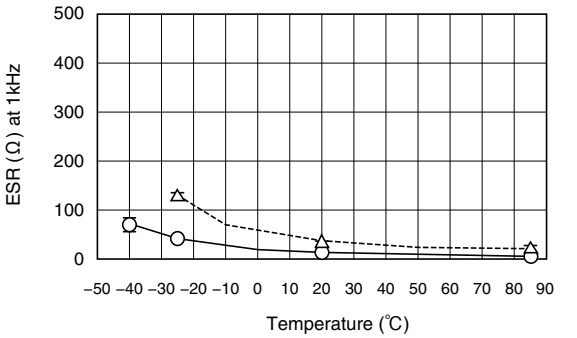


■ Characteristics at high and low temperature





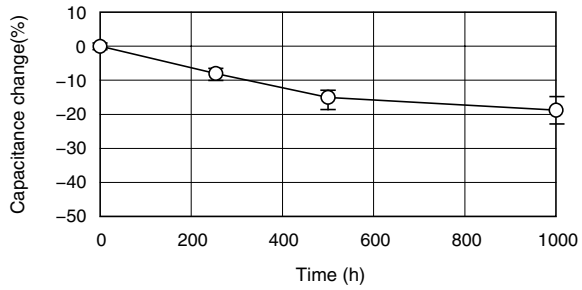


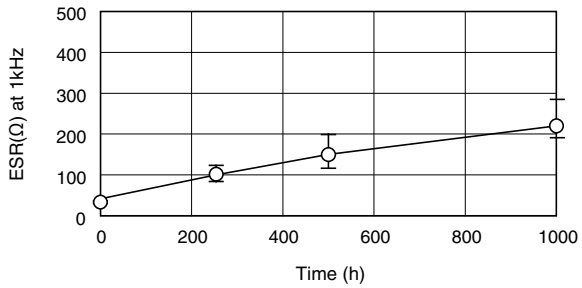


NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

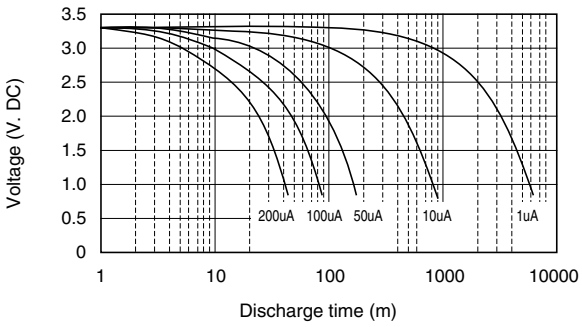
DYNACAP Series DSK
3.3V 0.22F/DSK-3R3H224 φ6.8×2.1L (mm)

■ Endurance (60℃ 3.3V.DC)

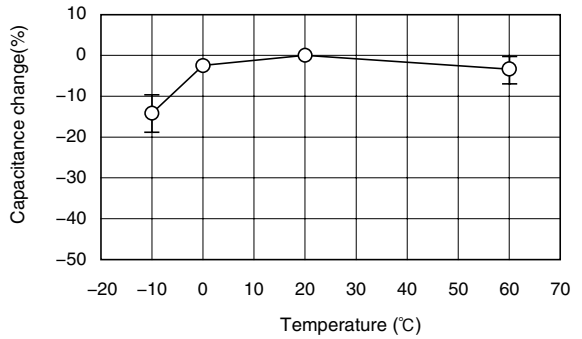


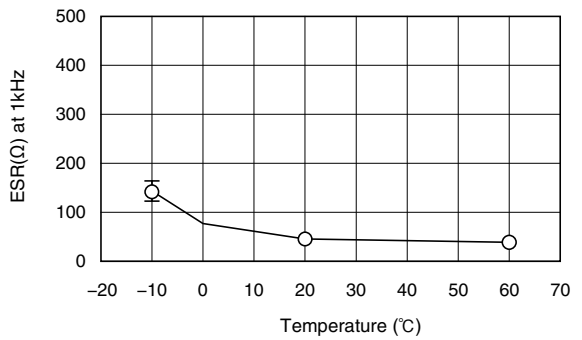


■ Discharge characteristics



■ Characteristics at high and low temperature

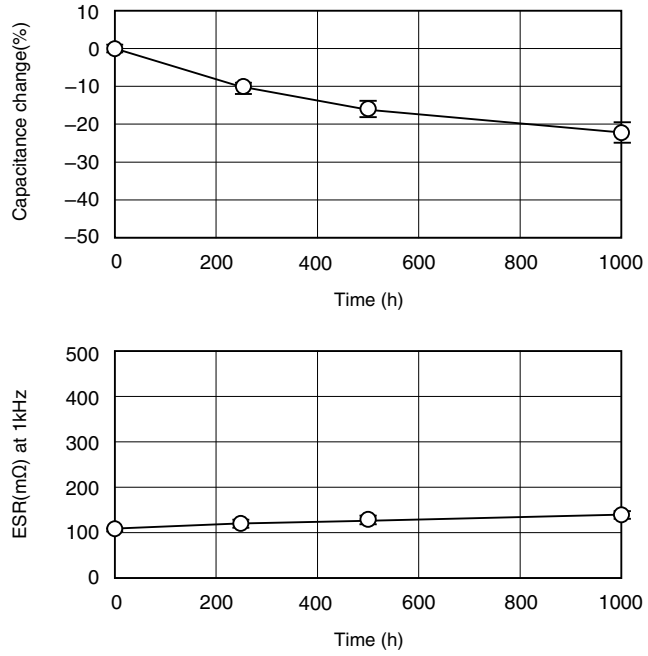




7-2 Cylindrical type for power

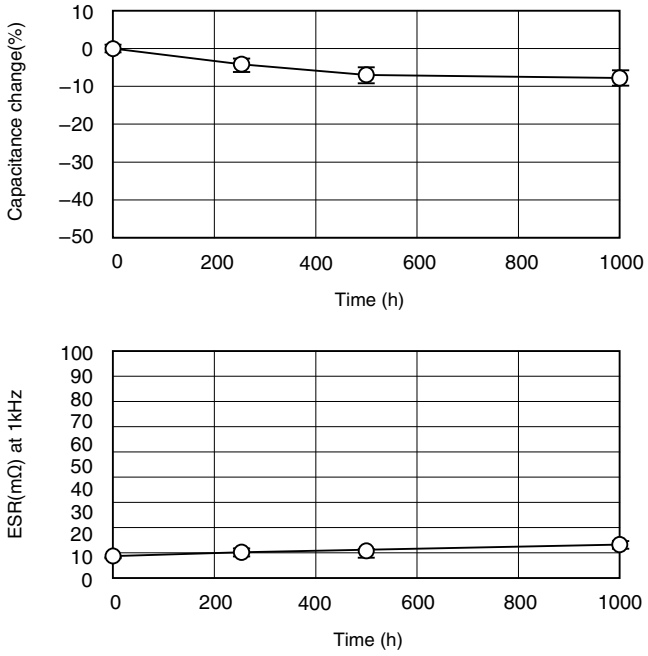
DYNACAP Series DZN
2.7V 2.7F/DZN-2R7D275G5ST φ8X20L (mm)

■ Endurance (70℃ 2.7V.DC)

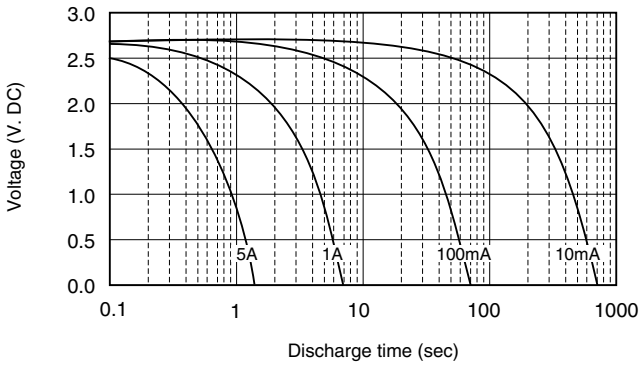


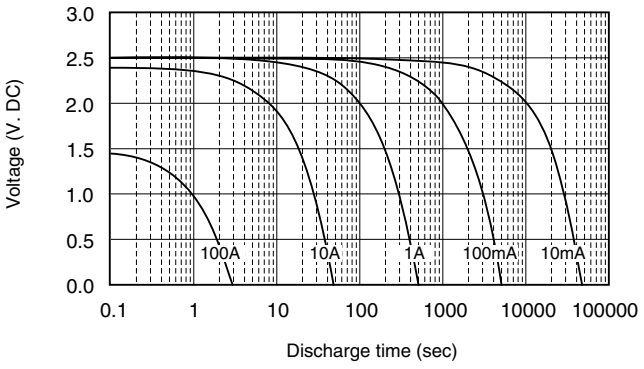
DYNACAP Series DZN
2.5V 200F/DZN-2R5D207S57T φ35X50L (mm)

■ Endurance (70℃ 2.5V.DC)

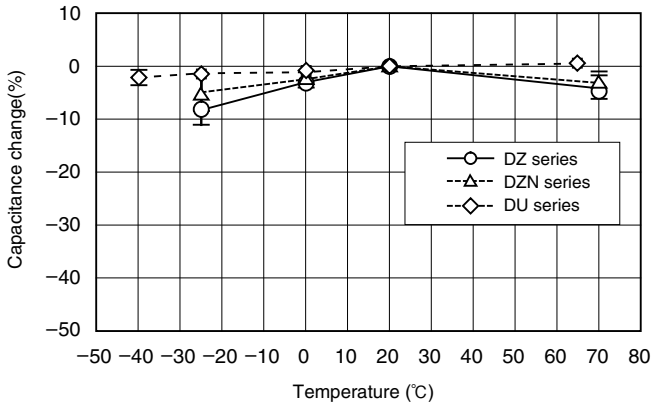


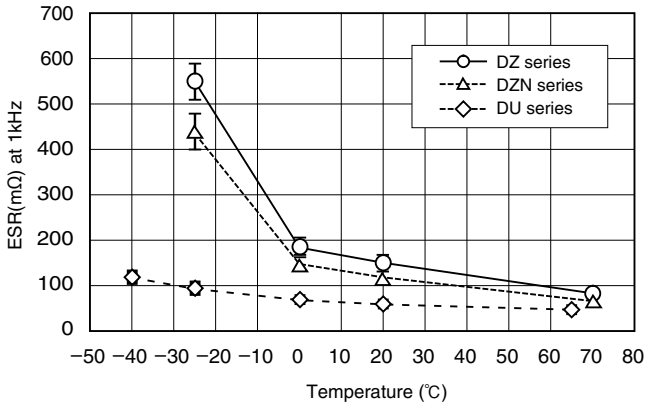
■ Discharge characteristics





■ Characteristics at high and low temperature





EDLC

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.